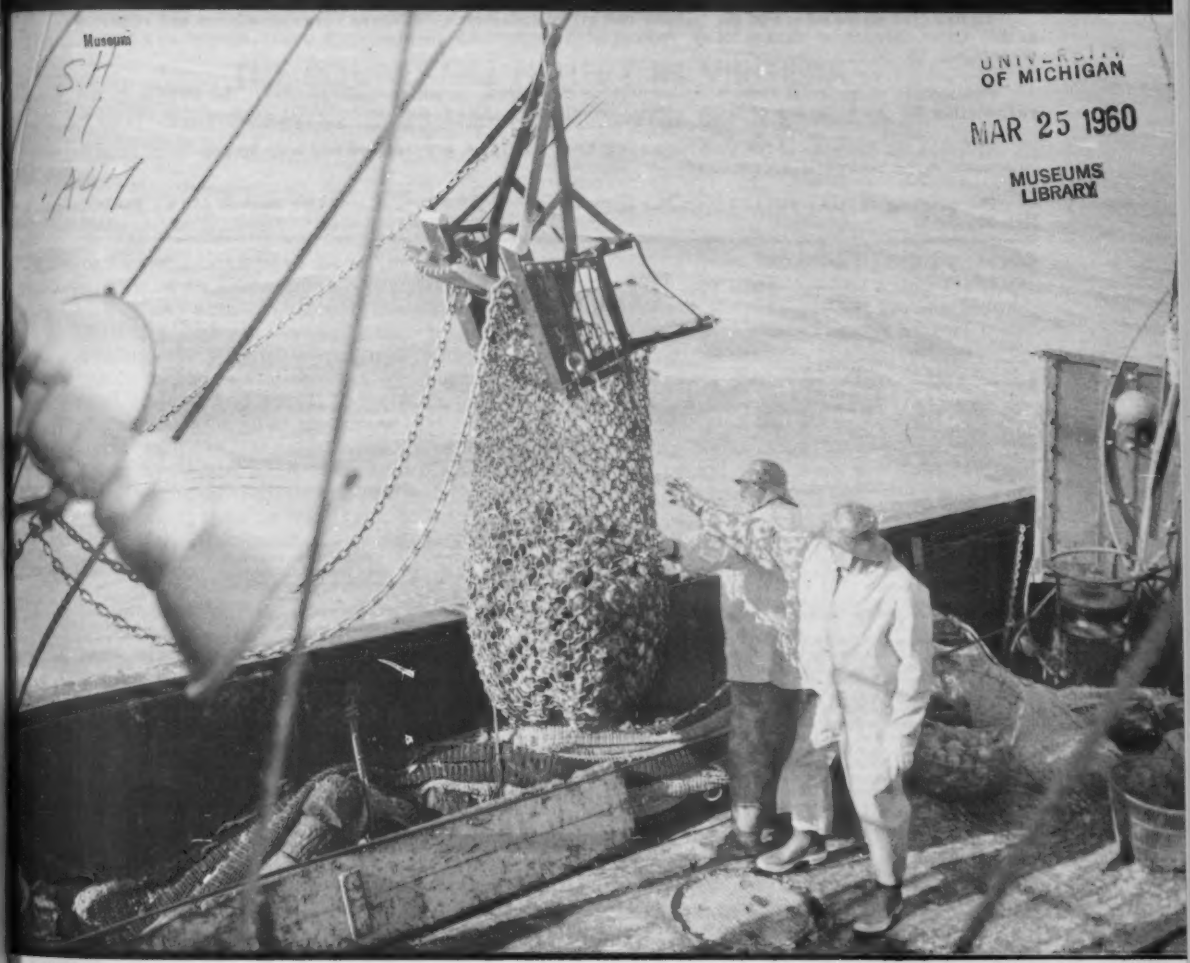
COMMERCIAL FISHERIES REVIEW



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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries prepared in the BUREAU OF COMMERCIAL FISHERIES.

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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Chief, Branch of Market News, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.

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CONTENTS

COVER: A clam dredge with a load of hard clams being hoisted aboard the U. S. Bureau of Commercial Fisheries chartered vessel Silver Bay. Exploratory clam dredging was conducted off the North Carolina Coast during an exploratory fishing cruise which was completed on December 13, 1959. (See p. 42 of this issue.)

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THE POUND-NET FISHERY IN VIRGINIA

Part 2 - Species Composition of Landings Reported as Menhaden[1/]

By J. L. McHugh*

BACKGROUND

Pound nets have been the most important fishing gear for food fishes in Virginia waters of Chesapeake Bay since 1880 (Reid 1955) and the history of this fishery to a great extent reflects the varying fortunes of the fisheries of that State. Since 1929 the average annual catch in pound nets in Virginia has been about 50 million pounds, roughly 20 percent of which was reported as menhaden. Actually these menhaden include varying quantities of other fish species, sometimes predominantly young food fishes, too small to market as human food. This part of the pound-net catch is sometimes used as industrial fish, but in many parts of the Bay it is sold as bait for crab pots. It is commonly referred to as "scrap fish," and for convenience this term has been used here to denote that part of the pound-net catch not sold for human consumption. Concern has been expressed at various times that this harvest of small fishes is wasteful, yet no really effective action has been taken to determine the facts needed for an intelligent appreciation of the situation.

Reid (1955) has reviewed the tribulations that accompanied introduction of pound nets to Virginia waters. Early reports of the Virginia Commission of Fisheries emphasize the "destruction" caused by these nets, and in 1914 a "cull law" was enacted designating minimum sizes of fishes that may be caught (Code of Virginia, Section 28-45). It soon became apparent that the value of this law was limited, for most undersized fish were dead before culling could be done, and it was suggested on various occasions that an increase in mesh size, or closed seasons at certain times, would offer more practical solutions.

Almost as soon as these remedial measures have been proposed they have been challenged by others. Some of the objections seem reasonable, but there is an obvious thread of self-interest running through all the controversy that has been generated, and none of the arguments is supported by indisputable facts. Culling is far from a practical solution: it would be impossible in bad weather; even under the best of conditions it would be time-consuming, and many fishermen would not be inclined to make the effort for a gain that was not immediately apparent; and most fish probably would not survive the rough handling that would ensue. An increase in mesh size, although it has been a popular remedy on many occasions, is opposed by many fishermen on the grounds that fish would gill in the nets. Closed seasons, when they have been proposed seriously, have been suggested for midsummer, when pound-net catches are at a minimum and relatively unprofitable, and the benefits to be gained would be at a minimum, too.

The conviction that an increase in mesh size would allow many small fish to escape, though opposed by many fishermen who believed that gilling would interfere

1/Contributions from the Virginia Fisheries Laboratory, No. 89.

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seriously with their operations, was sufficiently strong that in 1928 the General Assembly of Virginia directed the Commission of Fisheries to conduct experiments with various mesh sizes. This was done (Houston 1929) by arrangement with certain fishermen who placed panels of $2\frac{1}{2}$- and 3-inch stretched mesh in their nets, and the following conclusion was drawn: "It is claimed that mesh larger than an inch bar (2 inches stretched) will gill fish to an extent to make it impracticable. The experiments, as reported, bore out this contention." In the absence of better documentary evidence, it can scarcely be maintained that the matter was settled adequately.

Declines in Virginia fisheries since World War II, economic as well as biological in origin (McHugh and Bailey 1957), brought the question to the fore once again, and in 1952 the General Assembly instructed the Commission of Fisheries and the Virginia Fisheries Laboratory "to determine the proper size mesh for nets in fixed fishing devices." The proponents of this bill failed to recognize the full implication of their directive, which, if it is to be complied with in full measure, will require knowledge of the effects of mesh-size changes upon the future supply of fish. This, in effect, is already one of the objectives of the work of the Virginia Fisheries Laboratory, progress toward which, although steady, has been slow by reason of limited funds and personnel and the need for more comprehensive programs of research in neighboring states, where these species are also exploited.

Samples of scrap fish after they have been culled by fishermen from pound-net catches in the lower York River and off York Spit were examined in 1954 and 1955, primarily to study size- and age-composition of the menhaden catch (McHugh, Oglesby, and Pacheco 1959). When convenient, other species in this scrap were measured and weighed. In 1958 a special effort was made to examine samples of scrap at weekly intervals throughout the fishing season, and all species in a half-bushel sample were measured and weighed individually. If more than 100 fish of a species were present, the excess usually were counted but not measured or weighed, and the total weight of that species was estimated from the weight of the first 100. Lengths were measured from tip of snout to fork of caudal fin, or in fishes like hogchoker, croaker, or gray sea trout, to the end of the longest caudal rays. In 1958 also, the total weights of individual food fish species and total weights of scrap landed were obtained whenever possible, for comparison of the numbers and weights used as human food or as industrial fish and bait.

1954 SAMPLES

The 1954 study was made by a graduate student as a term project. He identified 21 species in 21 samples, but lumped alewife and glut herring, and butterfish and harvestfish. It is fairly obvious that he failed to recognize thread herring as a distinct species, for although it figured prominently in 1955 and 1958 catches, it was not listed in 1954. Thread herring undoubtedly were confused with river herrings, for this category was recorded for every sample examined in 1954, although later experience, and

Table 1 - Species Composition of Scrap Fish Samples from Pound-Net Catches, Lower York River, Virginia, 1954, Obtained by Adding Numbers of Fishes in all Samples Examined

Common Name	Scientific Name	Total Numbers of Fish	Percentage of Samples in Which Species Occurred
Menhaden	Brevoortia tyrannus	2,100	100
Alewife Glut herring Thread herring	Alosa pseudoharengus Alosa aestivalis Opisthonema oglinum	637	100
Butterfish Harvestfish	Poronotus triacanthus Peprilus alepidotus	562	91
Mitchill's anchovy	Anchoa mitchilli	144	43
Gray sea trout	Cynoscion regalis	90	86
Spot	Leiostomus xanthurus	77	76
Silver perch	Bairdiella chrysura	51	48
Cutlassfish	Trichiurus lepturus	41	38
Blue runner	Caranx crysos	27	19
Croaker	Micropogon undulatus	24	33
Flounder	Paralichthys dentatus	12	29
Hogchoker	Trinectes maculatus	6	29
Bluefish	Pomatomus saltratrix	6	14
Sea robin	Prionotus sp.	4	14
Puffer	Sphaeroides maculatus	2	10
Hickory shad	Alosa mediocris	1	5
Shad	Alosa sapidissima	1	5
Black sea bass	Centropristes striatus	1	5
Toadfish	Opsanus tau	1	5

previous knowledge of the migrations of river herrings, have shown that these species usually disappear from catches in July, whereas thread herring do not appear until June and remain until fall. Table 1 therefore does not show all species necessarily in their proper order of importance, and contains 22 species instead of the 21 recognized in the original work.

Table 2 - Species Composition of Scrap Fish Samples from Pound-Net Catches, Lower York River, Virginia, 1955, Obtained by Adding Numbers of Fishes in all Samples Examined

Common Name	Scientific Name	Total Numbers of Fish	Percentage of Samples in Which Species Occurred
Menhaden	Brevoortia tyrannus	1,672	100
Butterfish	Poronotus triacanthus	476	86
Gray sea trout	Cynoscion regalis	153	71
Thread herring	Opisthonema oglinum	118	29
Mitchill's anchovy	Anchoa mitchilli	93	57
Alewife	Alosa pseudoharengus	88	43
Glut herring	Alosa aestivalis		
Hickory shad	Alosa mediocris		
Scup	Stenotomus versicolor	42	21
Silver perch	Bairdiella chrysura	25	64
Spot	Leiostomus xanthurus	23	43
Harvestfish	Peprilus alepidotus	15	50
Cutlassfish	Trichiurus lepturus	8	29
Croaker	Micropogon undulatus	7	14
Moonfish	Vomer setapinnis	4	29
Black sea bass	Centropristes striatus	2	7
Hogchoker	Trinectes maculatus	1	7
Sea robin	Prionotus sp.	1	7
Puffer	Sphaeroides maculatus	1	7
Silverside	Menidia menidia	1	7

1955 SAMPLES

A few samples in 1955 were examined by the author, but most by a summer assistant who had difficulty distinguishing between alewife, glut herring, and hickory shad. Therefore, these species are grouped in table 2, and may not be in proper sequence according to numbers or frequency of occurrence. In 14 samples of scrap, 20 species were recognized. It is interesting that moonfish (Vomer setapinnis), fairly common in 1955, did not appear in pound-net catches in 1954 or 1958.

Sampling in 1955 was in some respects not as representative as in 1954 and 1958, for no catches were examined from August 13 to November 26.

1958 SAMPLES

Sampling in 1958 was more thoroughly and carefully done, and identifications were checked for accuracy. In 25 samples, 33 species were recognized (table 3.)

Table 3 - Species Composition of Scrap Fish Samples from Pound-Net Catches, Lower York River, Virginia, 1958, Obtained by Adding Numbers and Weights of Fishes in all Samples Examined

Common Name	Scientific Name	Total Numbers of Fish	Percentage of Samples in Which Species Occurred	Total Weight (Lbs.)
Menhaden	Brevoortia tyrannus	5,821	100	294,662
Butterfish	Poronotus triacanthus	1,274	84	57,106
Thread herring	Opisthonema oglinum	403	56	23,005
Gray sea trout	Cynoscion regalis	260	72	20,663
Blue runner	Caranx crysos	226	36	12,588
Spot	Leiostomus xanthurus	219	80	13,555
Alewife	Alosa pseudoharengus	207	28	12,873
Glut herring	Alosa aestivalis	177	32	29,984
Bigeye scad	Trachurops crumenophthalma	107	36	3,973
Silver perch	Bairdiella chrysura	88	72	6,274
Mitchill's anchovy	Anchoa mitchilli	80	20	142
Bluefish	Pomatomus saltatrix	34	32	2,852
Hogchoker	Trinectes maculatus	34	36	1,238
Croaker	Micropogon undulatus	25	12	2,468
Scup	Stenotomus versicolor	22	28	1,836
Harvestfish	Peprilus alepidotus	11	24	769
Hickory shad	Alosa mediocris	8	16	2,070
Shad	Alosa sapidissima	4	12	1,193
Blue crab	Callinectes sapidus	4	12	248
Black sea bass	Centropristes striatus	3	12	359
Spotted hake	Urophycis regius	3	8	112
Striped anchovy	Anchoa hepsetus	3	8	37
Silverside	Menidia menidia	3	8	22
Flounder	Paralichthys dentatus	3	12	221
Northern puffer	Sphaeroides maculatus	2	8	221
Pinfish	Lagodon rhomboides	1	4	51
Pigfish	Orthopristis chrysopterus	1	4	63
Atlantic mackerel	Scomber scombrus	1	4	81
Atlantic needlefish	Strongylura marina	1	4	5
Bluegill	Lepomis macrochirus	1	4	106
Common sea robin	Prionotus carolinus	1	4	12
Gizzard shad	Dorosoma cepedianum	1	4	346

For most samples, also, records were obtained of total weight of each species caught, so that the numbers and weights of each species used as food or discarded as scrap could be estimated (table 4). The 17 samples summarized in table 4, taken from

Table 4 - Estimated Total Numbers and Weights of Each Species in a Series of 17 Pound-Net Catches Made from April 7, to October 15, 1958, in the Lower York River or off York Spit, Virginia1/

Species	Food Fish		Scrap Fish	
	Estimated Numbers	Total Weights (Lbs.)	Estimated Numbers	Total Weights (Lbs.)
Menhaden	-	-	207,616	23,157
Butterfish	23,250	4,650	40,838	4,333
Alewife	-	-	10,864	1,327
Thread herring	-	-	9,761	1,259
Glut herring	-	-	8,545	3,325
Spot	5,714	1,699	8,255	1,228
Gray sea trout	20,221	7,410	7,622	1,342
Blue runner	-	-	5,192	640
Bay anchovy	-	-	4,203	17
Bigeye scad	-	-	2,780	236
Silver perch	-	-	2,408	369
Croaker	22,121	20,331	1,280	295
Bluefish	25	25	1,261	234
Hogchoker	-	-	1,028	70
Scup	-	-	793	119
Harvestfish	1,400	400	565	95
Hickory shad	-	-	445	317
Shad	125	437	200	134
Spotted hake	-	-	167	14
Flounder	111	277	139	34
Silverside	-	-	132	2
Black sea bass	-	-	128	28
Striped anchovy	-	-	101	1
Gizzard shad	-	-	72	55
Bluegill	-	-	71	17
Pigfish	-	-	71	10
Needlefish	-	-	67	10
Pinfish	-	-	58	6
Blue crab	-	-	32	5
Sea robin	-	-	29	1
Puffer	-	-	29	1
Rockfish	33	66	-	-
Slender amberjack	25	25	-	-
False albacore	10	100	-	-
Mixed fishes	-	800	-	-
Total	2/73,035	36,220	314,752	38,681

1/Estimated numbers of food fishes were derived from total weight of catch multiplied by average numbers of commercial-size fish per pound. Estimated numbers of scrap fish and their total weights were derived from numbers and weights of scrap in each sample, and the total weight of scrap fish in each catch.
2/Number of mixed fishes not included.

catches in the lower York River or off York Spit from April 7 to October 15, 1958, show that roughly equal weights of food and scrap fish were landed, but that more than four times as many fish were discarded as scrap. Many scrap fish were of species that usually are not used as food, such as menhaden, thread herring, blue runner, anchovy, scad, and silver perch, but some important food fishes, such as butterfish and spot, were more numerous in scrap than in food-fish landings.

Seasonal variations in species composition and in numbers and weights of scrap fish in pound-net samples, weighted according to total catch of scrap, are given in tables 5 and 6 (which appear on page 5). In early spring, only menhaden, alewives, and glut herring were found, but a variety of species entered the catch as the season progressed. Some species appeared for a while and then disappeared, some occurred only spasmodically, others were caught regularly once they put in an appearance. Samples taken at regular intervals may not be truly representative of the relative abundance of the different species, because some fishes, like alewives and blue runner, remain in Chesapeake Bay for only a short time, while others, like menhaden, are available for most of the year.

These may have included some scup, spot, gray sea trout, croaker, bluefish, harvestfish, shad, flounder, puffer, rockfish, amberjack, drum, whiting, mackerel, mullet, spotted sea trout, Spanish mackerel, white perch, and others. These samples are not necessarily representative of the pound-net catch in the whole area of Tidewater Virginia, for our observations have shown that each locality has its own characteristic complex of species. Alewives, for example, are the most important

Table 5 - Estimated Catch, by Numbers, of Scrap Fish in Pound-Net Catches in the Lower York River, Virginia, 1958 1/

Species	April			May		June	July				August		September			October	
	7	22	30	13	20	5	1	15	25	30	7	19	5	12	23	3	15
Menhaden	6,720	4,004	8,800	35,024	12,324	30,250	19,333	6,050	3,600	5,175	3,379	14,666	21,743	23,641	13,977	1,400	3,265
Glut herring	6,090	858	67	516	1,185	-	-	-	-	-	-	-	-	-	-	-	-
Alewife	892	2,646	6,867	194	316	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	-	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spot	-	1,430	2,267	838	2,133	1,080	-	40	97	46	347	-	-	65	34	117	58
Butterfish	-	-	67	774	79	3,920	6,840	8,090	6,140	3,370	916	2,733	1,054	1,500	477	1,808	3,156
Shad	-	-	-	64	158	-	-	-	-	-	-	-	-	-	-	-	-
Silver perch	-	-	-	258	632	-	64	40	97	-	63	333	36	424	375	175	-
Pinfish	-	-	-	64	-	-	-	-	-	-	-	-	-	-	-	-	-
Hickory shad	-	-	-	-	395	-	-	-	-	-	-	-	36	-	34	-	19
Croaker	-	-	-	-	1,422	-	-	-	-	-	-	-	-	-	-	-	-
Bluefish	-	-	-	-	158	250	-	430	97	323	-	-	-	-	-	-	19
Pigfish	-	-	-	-	79	-	-	-	-	-	-	-	-	-	-	-	-
Hogchoker	-	-	-	-	79	167	-	-	-	-	-	-	-	33	68	612	77
Gray sea trout	-	-	-	-	237	167	575	1,880	1,460	1,845	316	733	109	130	136	58	-
Bluegill	-	-	-	-	79	-	-	-	-	-	-	-	-	-	-	-	-
Harvestfish	-	-	-	-	-	333	-	80	-	-	-	133	-	-	-	-	19
Thread herring	-	-	-	-	-	416	383	118	7,200	740	189	333	109	-	273	-	-
Flounder	-	-	-	-	-	80	-	40	-	-	-	-	-	-	-	-	19
Spotted hake	-	-	-	-	-	167	-	-	-	-	-	-	-	-	-	-	-
Scup	-	-	-	-	-	333	-	40	-	46	-	-	-	-	34	321	19
Bay anchovy	-	-	-	-	-	-	2,872	-	65	785	442	-	-	-	-	-	38
Silverside	-	-	-	-	-	-	-	40	-	92	-	-	-	-	-	-	-
Blue crab	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-
Black sea bass	-	-	-	-	-	-	-	-	-	-	32	67	-	-	-	29	-
Atlantic needlefish	-	-	-	-	-	-	-	-	-	-	-	67	-	-	-	-	-
Blue runner	-	-	-	-	-	-	-	-	-	-	-	800	727	228	1,739	963	736
Bigeye scad	-	-	-	-	-	-	-	-	-	-	-	133	182	261	1,193	875	135
Striped anchovy	-	-	-	-	-	-	-	-	-	-	-	-	36	65	-	-	-
Common sea robin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-
Northern puffer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-
Number of nets	6	-	-	3	6	4	4	4	4	4	3	3	3	3	3	3	2

1/Total numbers of each species estimated from total weight of scrap in each day's catch according to the ratio of numbers to weight in each sample.

Table 6 - Estimated Catch, in Pounds, of Scrap Fish in Pound-Net Catches in the Lower York River, Virginia, 1958 1/

Species	April			May		June	July				August		September			October	
	7	22	30	13	20	5	1	15	25	30	7	19	5	12	23	3	15
Menhaden	1,477	1,073	1,113	3,450	2,596	3,263	2,311	734	517	873	354	2,250	1,296	1,170	990	97	176
Glut herring	2,388	267	29	207	505	-	-	-	-	-	-	-	-	-	-	-	-
Alewife	335	360	499	22	126	-	-	-	-	-	-	-	-	-	-	-	-
Gizzard shad	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spot	-	245	352	105	304	174	-	8	8	2	35	-	-	+	+	17	7
Butterfish	-	-	7	91	9	316	524	826	752	435	123	360	130	165	60	229	315
Shad	-	-	-	73	76	-	-	-	-	-	-	-	-	-	-	-	-
Silver perch	-	-	-	45	98	-	9	8	19	-	8	30	5	75	60	27	-
Pinfish	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Hickory shad	-	-	-	-	349	-	-	-	-	-	-	-	2	-	+	-	1
Croaker	-	-	-	-	328	-	-	-	-	-	-	-	-	-	-	-	-
Bluefish	-	-	-	-	24	57	-	71	20	63	-	-	-	-	-	-	2
Pigfish	-	-	-	-	11	-	44	-	-	-	-	-	-	-	-	-	-
Hogchoker	-	-	-	-	7	6	-	-	-	-	-	-	-	+	+	48	10
Gray sea trout	-	-	-	-	48	26	99	310	285	320	46	150	20	15	15	13	-
Bluegill	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-
Harvestfish	-	-	-	-	-	46	-	19	-	-	-	30	-	-	-	-	1
Thread herring	-	-	-	-	-	52	-	17	893	98	29	60	21	-	45	-	-
Flounder	-	-	-	-	-	31	-	2	-	-	-	-	-	-	-	-	1
Spotted hake	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-
Scup	-	-	-	-	-	15	-	5	-	5	-	-	-	-	+	89	5
Bay anchovy	-	-	-	-	-	-	13	-	1	2	1	-	-	-	-	-	1
Silverside	-	-	-	-	-	-	-	+	-	2	-	-	-	-	-	-	-
Blue crab	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-
Black sea bass	-	-	-	-	-	-	-	-	-	-	4	10	-	-	-	14	-
Atlantic needlefish	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-
Blue runner	-	-	-	-	-	-	-	-	-	-	-	90	110	45	225	100	70
Bigeye scad	-	-	-	-	-	-	-	-	-	-	-	10	15	30	105	64	11
Striped anchovy	-	-	-	-	-	-	-	-	-	-	-	-	1	+	-	-	-
Common sea robin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Northern puffer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Number of nets	6	-	-	3	6	4	4	4	4	4	3	3	3	3	3	3	2

1/Total catch of scrap fish for each day prorated according to weight of each species in sample.
+ = Less than one pound.

species by weight in Virginia's pound-net catch, but they were of less importance in our samples from the York River, partly because early spring catches were not adequately sampled. Butterfish ranked tenth in importance by weight in 1957, but they were one of the most important species in York River samples in 1958. On the other hand there is general similarity between pound-net catches as recorded by the U. S. Bureau of Commercial Fisheries (Power 1959) and the 17 samples from the York River in 1958.

SPECIES COMPOSITION OF POUND-NET LANDINGS

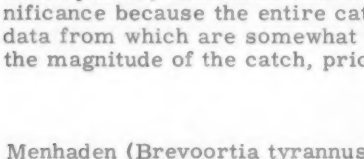
One of the first steps in a study of industrial and unmarketable food fishes is to determine what species are represented, and in what quantities. According to latest published figures pound nets in Virginia caught at least 42 species in 1957 (Power 1959). This is a minimum estimate, for certain categories in the official listing, such as alewives, catfish and bullheads, and some others, include more than one species, and scrap includes many species that are not used locally for human food, hence are not listed in official statistics. Investigations reported here showed that at least 35 species occur in pound-net scrap (table 1 to 3), at least 13 of which are not marketed in Virginia for human food. Table 7 (see p. 7) lists all species known to occur in pound-net catches in Virginia, based on 1957 landings (Power 1959), samples of scrap examined in 1954, 1955, and 1958, and observations made by various staff members of the Virginia Fisheries Laboratory while sampling catches.

Scrap-fish landings vary not only locally within the Bay and its estuaries, but also annually. It has been pointed out already that moonfish were found in our samples only in 1955. Cutlassfish, fairly common in 1954 and less common in 1955, were absent in 1958. Several other interesting changes are suggested by the figures in tables 1 to 3, but it would require more information to determine their significance. There is good reason to believe, for example, that young croaker figured much more prominently in scrap in the past when the species was more abundant, and the decline in frequency of their appearance in samples from 1954 to 1958 is suggestive that the recent increase in abundance is only temporary, a conclusion supported by other evidence (W. H. Massmann and A. L. Pacheco, personal communication).

It is convenient to treat scrap fish under two main headings: nonfood or industrial species, measurements and weights of which have considerable biological significance because the entire catch was represented in each sample; and food fishes, data from which are somewhat less useful because culling is variable, depending on the magnitude of the catch, prices, and other factors.

NON-FOOD FISHES

Menhaden (Brevoortia tyrannus):
Atlantic coast, 1957: 1,327,595,000 pounds, valued at $16,771,000.



By far the most important scrap species was menhaden, which made up nearly two-thirds of scrap catches by numbers and by weight, and was the only species that occurred in every sample examined. By weight, menhaden are an important component of pound-net landings in Virginia. According to official statistics (Power 1959) more than 25 million pounds were landed in 1957, about 46 percent of the entire pound-net catch, and nearly 10 percent of the total menhaden catch of the State. Menhaden landings as reported for pound nets probably are a collective term for all scrap fish, hence only about 16 million pounds actually were menhaden, and the remaining 9 million pounds included a variety of species as listed in table 7 (p. 7). Most menhaden caught by pound nets in Virginia

Table 7 - Species Caught by Pound Nets in Virginia, Based on 1957 Commercial Landings, Examination of Scrap-Fish Catches in 1954, 1955, and 1958 and Observations Made While Sampling Catches1/

Common Name	Scientific Name	Disposal of Catch		Common Name	Scientific Name	Disposal of Catch	
		Food	Industrial Use or Bait			Food	Industrial Use or Bait
Alewife	Alosa pseudoharengus	x	x	Pigfish	Orthopristis chrysopterus	x	x
Amberjack, slender	Seriola zonata	x	x	Pinfish	Lagodon rhomboides		x
Anchovy, bay	Anchoa mitchilli		x	Pompano, common	Trachinotus carolinus	x	x
Anchovy, striped	Anchoa hepsetus		x	Puffer, northern	Sphaeroides maculatus	x	x
Barracuda	Sphyraena quachancho		x	Puffer, smooth	Lagocephalus laevigatus		x
Bass, striped	Roccus saxatilis	x	x	Rays:			x
Bigeye	Priacanthus arenatus		x	bullnose	Myliobatis freminvilli		x
Bigeye, short	Pseudopriacanthus altus	x	x	cownose	Rhinoptera bonasus		x
Blue crab	Callinectes sapidus	x	x	greater butterfly	Gymnura altevela		x
Bluegill	Lepomis macrochirus		x	lesser butterfly	Gymnura micrura		
Bluefish	Pomatomus saltatrix	x	x	spotted eagleray	Aetobatus narinari		
Bonefish	Albula vulpes		x	stingaree	Dasyatis sabina		x
Bonito, Atlantic	Sarda sarda	x	x	Remora, shark	Echeneis naucrates		x
Bullhead, brown	Ictalurus nebulosus	x	x	Runner, blue	Caranx crysos		x
Bullhead, yellow	Ictalurus natalis	x	x	Scad, bigeye	Trachurops crumenophthalma		x
Burrfish	Chilomycterus schoepfi		x	Scup	Stenotomus versicolor	x	x
Butterfish	Poronotus triacanthus	x	x	Sea bass, black	Centropristes striatus	x	x
Butterflyfish	Chaetodon ocellatus		x	Sea robin, common	Prionotus carolinus		x
Carp	Cyprinus carpio	x	x	Sea trout, gray	Cynoscion regalis	x	x
Catfish, channel	Ictalurus punctatus	x	x	Sea trout, silver	Cynoscion nothus	x	x
Catfish, white	Ictalurus catus	x	x	Sea trout, spotted	Cynoscion nebulosus	x	x
Cobia	Rachycentron canadus	x		Shad	Alosa sapidissima	x	x
Croaker, Atlantic	Micropogon undulatus	x	x	Shad, gizzard	Dorosoma cepedianum	x	x
Croaker, banded	Larimus fasciatus		x	Shad, hickory	Alosa mediocris	x	x
Cutlassfish	Trichiurus lepturus		x	Sharks:			x
Drum, black	Pogonias cromis	x	x	brown	Eulamia milberti		
Drum, red	Sciaenops ocellata	x	x	angelshark	Squatina dumeril		x
Eel, American	Anguilla rostrata	x	x	common hammer-head	Sphyrna zygaena		x
Eel, conger	Conger oceanica		x	smooth dogfish	Mustelus canis		x
Filefish, common	Monacanthus hispidus		x	Sheepshead	Archosargus probatocephalus	x	
Filefish, orange	Alutera schoepfi		x	Silverside, Atlantic	Menidia menidia		x
Flounder, sand	Lophopsetta aquosa		x	Skate, brier	Raja eglanteria		x
Flounder, summer	Paralichthys dentatus	x	x	Spadefish	Chaetodipterus faber	x	x
Flounder, winter	Pseudopleuronectes americanus	x	x	Spot	Leiostomus xanthurus	x	x
Gar, longnose	Lepisosteus osseus		x	Squid	Loligo pealii		x
Goosefish	Lophius americanus		x	Stargazer, northern	Astroscopus guttatus		x
Hake, spotted	Urophycis regius	x	x	Sturgeon, Atlantic	Acipenser sturio	x	
Harvestfish	Peprilus alepidotus	x	x	Sucker, chub	Erimyzon oblongus	x	x
Herring, bigeye	Elops saurus		x	Suckers, Eastern redhorse	Moxostoma macrolepidotum	x	x
Herring, glut	Alosa aestivalis	x	x	Tarpon	Tarpon atlantica		x
Herring, sea	Clupea harengus		x	Tautog	Tautog onitis	x	x
Herring, thread	Opisthonema oglinum		x	Terrapin, diamondback	Malaclemys terrapin	x	x
Hogchoker	Trinectes maculatus		x	Threadfish	Alectis crinitus		x
Jack, common	Caranx hippos		x	Toadfish	Opsanus tau		x
Lamprey, sea	Petromyzon marinus		x	Tonguefish	Symphurus plagiusa		x
Lizardfish, Atlantic	Synodus foetens		x	Triggerfish, common	Balistes carolinensis		x
Lookdown	Selene vomer		x	Tripletail	Lobotes surinamensis	x	
Lumpfish	Cyclopterus lumpus		x	Tuna, little	Euthynnus alleteratus		x
Mackerel, Atlantic	Scomber scrombrus	x	x	Turtles:		x	x
Mackerel, Spanish	Scomberomorus maculatus	x		green	Chelonia mydas		x
Menhaden	Brevoortia tyrannus		x	loggerhead	Caretta caretta	x	x
Moonfish	Vomer setapinnis		x	snapping	Chelydra serpentina		
Mullet, striped	Mugil cephalus	x		Atlantic ridley	Lepidochelys kempi		x
Needlefish, Atlantic	Strongylura marina		x	Whiting, northern	Menticirrhus saxatilis	x	x
Needlefish, flatside	Ablennes hians		x	Whiting, southern	Menticirrhus americanus	x	x
Perch, silver	Bairdiella chrysura	x	x				
Perch, white	Roccus americanus	x	x				
Perch, yellow	Perca flavescens	x	x				

1/The assistance of W. H. Massmann and A. L. Pacheco in making available the results of their long experience with the pound-net fishery is acknowledged gratefully.

are young fish (McHugh et al 1959) predominantly age-group II (in their second year of life) in spring and early summer, and age-group I (for their first year) in late summer and fall. In 1958, age-group I fish were exceedingly abundant in Virginia: small schools were seen everywhere in the estuaries through spring and summer, and mass mortalities, a common phenomenon when a species becomes unusually abundant, were reported from many areas; these fish showed up in late summer as a dominant feature of pound-net catches in the York River area, although they were of a size that could escape through the meshes of the nets quite easily, and very few older fish appeared in samples after mid-August. The excellent catches in the menhaden purse-seine fishery in 1959 undoubtedly included large numbers of fish of the 1958 year-class. Growth of these fish in length and weight, and their relative importance in numbers and total weight each month in 1958, are illustrated in figure 1. Samples of the 1958 year-class, caught in experimental trawls or taken by other methods, are included as polygons enclosed by broken lines on a different vertical scale. They show that pound nets in the lower York River take only larger fish of the incoming year class.

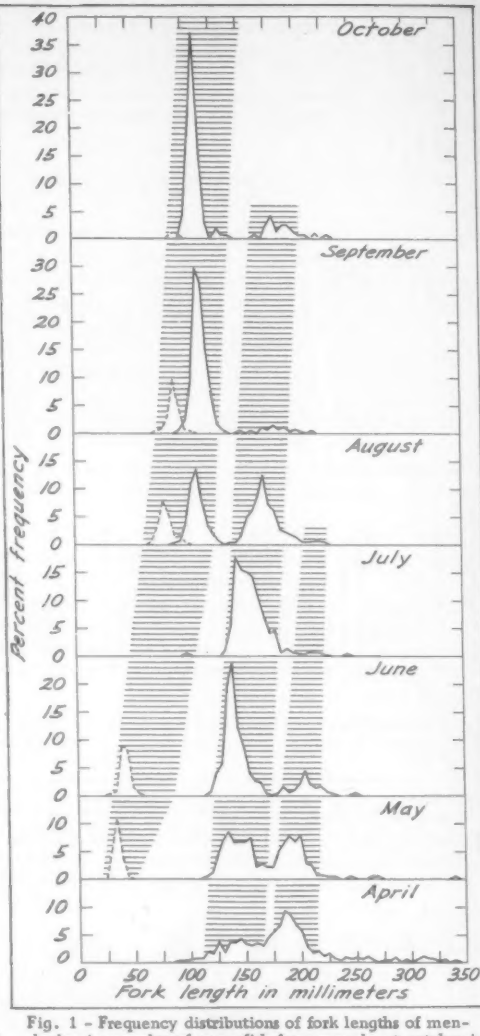
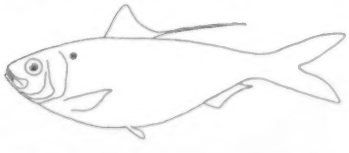


Fig. 1 - Frequency distributions of fork lengths of menhaden in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones emphasize the progression of size groups to the right as the season advances, and illustrate the growth of successive age groups of fish. Broken lines represent samples of young fish caught in experimental trawls.

Thread herring (Opisthonema oglinum):

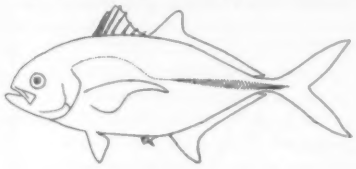
Almost half the samples examined in 1955 and 1958 contained thread herring, which first appeared in catches early in June and disappeared late in September. Hildebrand and Schroeder (1928) observed that this species appeared in the Bay about mid-May and left during October, that its spawning habits were almost completely unknown, and that fish taken in spring were thin and poor, whereas in fall they were fat. Thread herring taken in 1958 were quite uniform in size, but although mean fork length increased only slightly from spring to fall, weights increased substantially (fig. 2, p. 9). Gonads of fish caught in June were mostly in prespawning condition. In July most fish were spent or recovering from spawning, or were apparently immature, probably having recovered completely from a late spring or early summer spawning. In August and September all gonads were spent or in a resting condition. Apparently thread herring, like most other fishes, become thin and poor at spawning time but recover and fatten



quickly. The increase in weight from spring to fall is substantial, of the order of 20 percent. Females were about 5 mm. ($\frac{1}{5}$-inch) longer than males, on the average.

Blue runner (Caranx crysos):

This small fish, a member of the jack family, was prominent in



pound-net catches in 1958, but relatively unimportant in 1954, and absent in 1955. It did not appear in 1958 until after the middle of August, hence its absence in 1955 may have been caused by inadequate sampling, for no samples were examined in that year between August 13 and November 26. Hildebrand and Schroeder (1928) reported that marketable sizes ($\frac{1}{3}$ to 1 pound) were taken in small numbers at Lynnhaven Roads, Va., but that smaller fish, 5 to 8 inches long, were less common than Caranx hippos, the common jack, of about the same size. This may mean that young blue runner penetrate farther into the Bay than older fish or than common jacks, or that young were especially abundant in 1958, for no larger fish and no common jacks were known to be taken in the catches sampled. Blue runner were seen in the Fulton Fish Market, New York City, in September 1958, and dealers there say that there is a limited market for them, especially among southern Europeans, who find them similar to the "sardine" of the Mediterranean Sea.

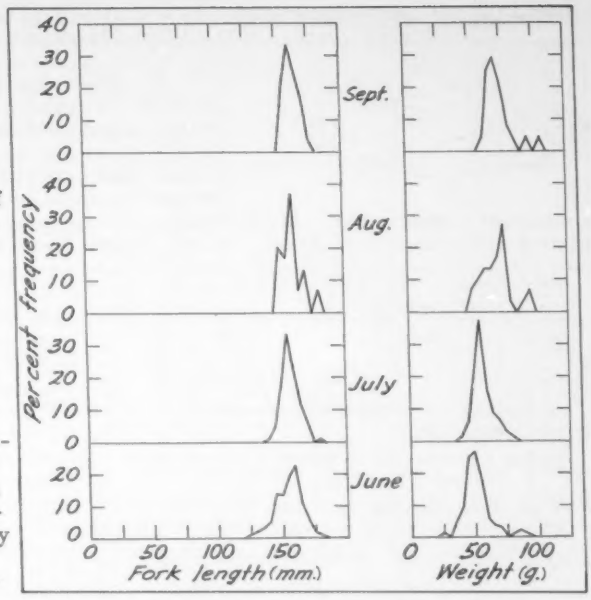


Fig. 2 - Frequency distributions of fork lengths and weights of thread herring in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958.

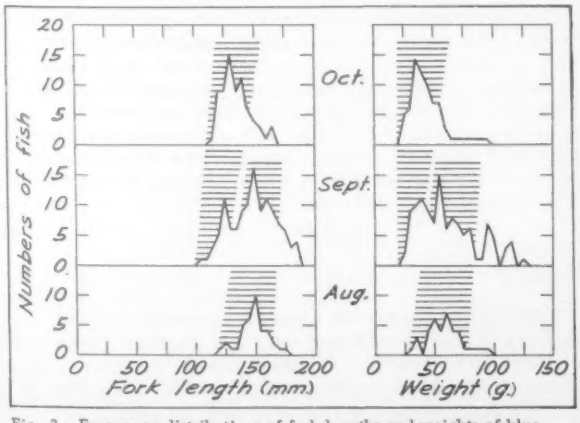
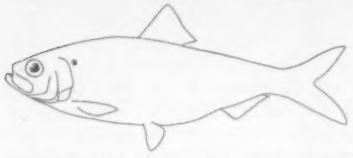


Fig. 3 - Frequency distributions of fork lengths and weights of blue runner in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones illustrate the presence of two size groups of fish.

Blue runner in scrap from York River pound nets ranged in fork length from about 105 to 185 mm. (4 to 7 inches), and thus corresponded in size to the 5- to 8-inch (total length) fish reported by Hildebrand and Schroeder (1928). Those seen in the New York City market in 1958 were of similar size. All fish examined in 1958 were immature, and size-frequency distributions (Fig. 3) suggest that two successive age groups dominated the catch: the first, with modal length increasing from 150 to 170 mm., in August and September, the second 125 to 130 mm., in September and October.

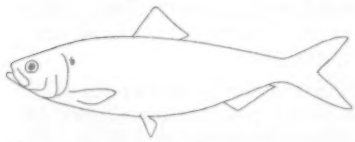
Alewife (Alosa pseudoharengus):
Atlantic coast, 1957: 57,206,000 pounds, valued at $686,000.



Alewives apparently are less important in the York River fishery than elsewhere in Virginia, and those caught in this area are not sold or processed in any great numbers as human food. In certain areas, especially the Rappahannock River, considerable numbers are salted or pickled, and the roe is separated and canned. In 1958 few alewives appeared in York River pound-net catches after the end of April. In fork length these fish fell into three groups (fig. 4), with modes at 125, 195, and 235-260 mm. (5, 8, and 9-10 inches), and 20, 85, and 170 to 250 g. ($\frac{1}{25}$, $\frac{1}{5}$, and $\frac{2}{5}$-$\frac{1}{2}$ pound), and probably were 1, 2, and 3 or more years old, respectively (Hildebrand and Schroeder 1928).

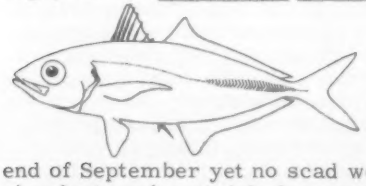
Fig. 4 - Frequency distributions of fork lengths and weights of alewife and glut herring in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958.

Glut herring (Alosa aestivalis):
Atlantic coast, 1957: landings included in figures for alewife.



Glut herring entered and left the pound-net fishery in spring perhaps a little later than alewives. Those examined in scrap samples in 1958 were larger on the average than the alewives (fig. 4). They fell into two groups according to size, with modes at about 160 and 245 mm. fork length ($6\frac{1}{2}$ to 10 inches), and 50 and 180 g. ($\frac{1}{10}$- to $\frac{2}{5}$-pound), and probably were 2 years and 3 years and older, respectively. Glut herring and alewives were among the most important pound-net species in spring, but because the fishery is seasonal they were later superseded in rank by others.

Bigeye scad (Trachurops crumenopthalma):



This small jack was almost as prominent in 1958 York River pound-net catches as blue runner, and entered the fishery at about the same time. This may explain its absence from 1955 samples which did not cover the late summer period. In 1954, however, samples were taken weekly until the end of September yet no scad were seen, which suggests that the species was less abundant, and certainly less available, than in 1958. Like the blue runner, this is

primarily a southern fish, and its appearance in Chesapeake Bay may be sporadic, for Hildebrand and Schroeder (1928) saw it only once. In 1958 scad were fairly uniform in size, but smaller fish were more frequent in October (fig. 5). Fork lengths ranged from about 105 to 160 mm. (4 to $6\frac{1}{2}$ inches), and weights from 15 to 70 g. ($\frac{1}{2}$ to $2\frac{1}{2}$ ounces). Bigeye scad of about this size were seen in the New York City market in September 1958, where they, like blue runner, are favored by certain customers because they resemble Mediterranean "sardines."

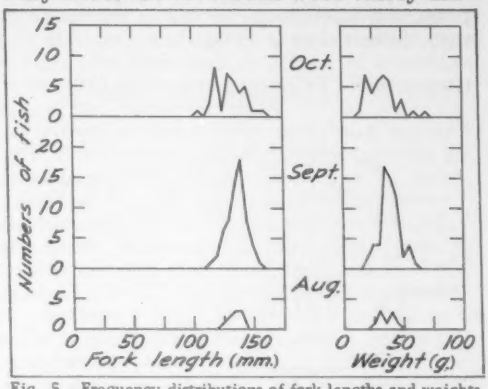
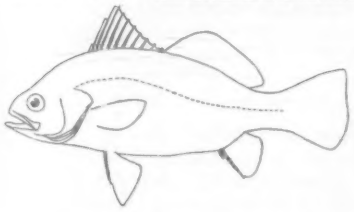


Fig. 5 - Frequency distributions of fork lengths and weights of bigeye scad in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958.

It is somewhat surprising that southern species like scad and blue runner should be unusually abundant in the Chesapeake and Middle Atlantic regions in 1958, for water temperatures along the coast were reported to be unusually low all summer. The 1958 menhaden purse-seine fishery was unusually successful in Chesapeake Bay but poor farther north. Perhaps scad and blue runner, like menhaden, became concentrated in the Chesapeake region rather than spreading out along the Middle Atlantic coast because water temperatures were too low farther north.

Silver perch (Bairdiella chrysura):



This species appeared quite frequently, but usually in small numbers, in York River catches (fig. 6). Although silver perch are abundant in Virginia and the meat is of good flavor, demand is negligible, probably because the fish are small. All silver perch caught in York River pound nets were included in scrap. They were probably in their third summer (Hildebrand and Schroeder 1928) with average length less than 175 mm. (7 inches) and average weight less than 75 g. ($\frac{1}{6}$-pound).

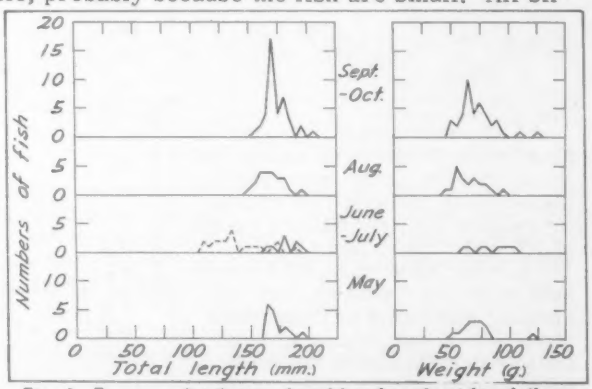
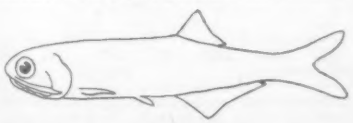


Fig. 6 - Frequency distribution of total lengths and weights of silver perch in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. The broken line in June-July represents a sample from the York River pound-net fishery examined in 1955.

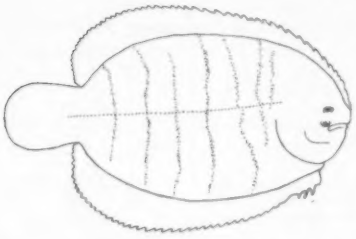
Bay anchovy (Anchoa mitchilli):



This anchovy is one of the most abundant fishes in Chesapeake Bay, undoubtedly important as food for many other species. Although it can escape easily through pound-net meshes, some fish are caught when schools stray into the nets. It is possible that some anchovies in pound-net scrap were regurgitated by larger fishes, but most were too fresh and undamaged to have

been caught in this indirect fashion. More than a third of all samples contained Bay anchovy, which, though an insignificant component of scrap by weight, was one of the principal species in terms of numbers caught. Fork lengths ranged from 53 to 72 mm. (about 2 to 3 inches).

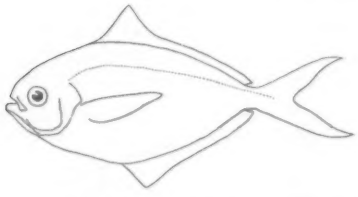
Hogchoker (Trinectes maculatus):
Atlantic coast, 1957: 7,000 pounds, valued at $421.



This is the most abundant flatfish in Chesapeake Bay, and its meat is said to be well-flavored, but it has little market value, probably because it is small. Atlantic coast commercial landings in 1956 were all in Maryland. Hogchokers appeared only sporadically in pound-net catches in spring and summer but increased in numbers in early October, probably during fall migration from the upper York River to the deeper waters of the Bay. Lengths ranged from about 95 to 170 mm. (4 to 7 inches), and weights reached a maximum of 85 g. ($\frac{1}{5}$-pound). Mansueti and Pauly (1956) concluded that hogchokers in the Patuxent River, Md., grew slowly, reaching a mean standard length of only 131 mm. (total length about 159 mm.) and a weight of 80 g. (about $\frac{1}{5}$ pound) at the end of 7 years. If York River fish grow as slowly, these fish were from 3 to more than 7 years old.

FOOD FISH

Butterfish (Poronotus triacanthus):
Atlantic coast 1957: 10,267,000 pounds, valued at $848,000.



This was the most important food fish in York River pound-net scrap in 1954, 1955, and 1958 (tables 1 to 3). Almost two-thirds by number and one-half by weight of all butterfish caught in the York River fishery in 1958 were sold as scrap (table 4), and the species was found in 86 percent of all scrap samples examined. Detailed studies have not been made of size composition of the entire catch of butterfish in Virginia pound nets, but examination of one sample from the food-fish catch suggested that there is considerable overlap in sizes retained for market or included in scrap (fig. 7, September). The smallest butterfish in all samples

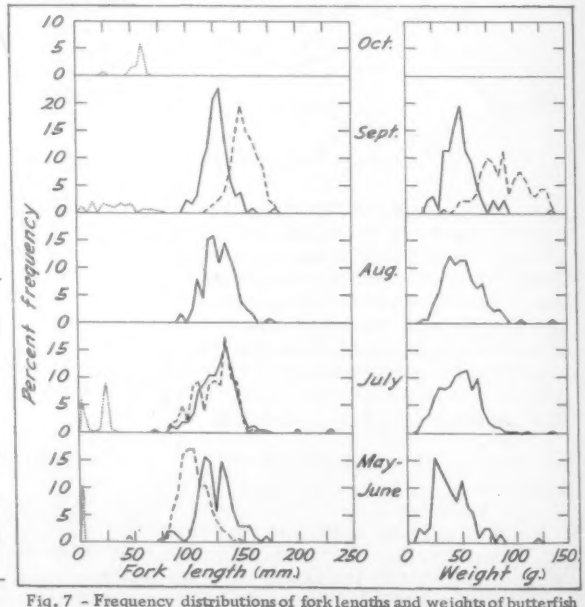
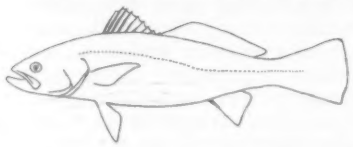


Fig. 7 - Frequency distributions of fork lengths and weights of butterfish in samples of scrap frish from pound-net catches in the York River area, Virginia, 1958. Dotted lines represent samples of young taken by Perlmutter (1939) near Long Island. Broken lines in May, June and July represent samples from the York River pound-net fishery measured in 1955. Broken lines in September represent a sample from the pound-net catch in 1958 after scrap butterfish had been culled out.

was 81 mm. ($3\frac{1}{4}$ inches) in fork length and weighed 10 g. ($\frac{1}{3}$ oz.); the largest 179 mm. and 136 g. (almost $\frac{1}{3}$ pound). Obviously, as Neville and Perlmutter (1941) observed in the Long Island fishery, sorting of the catch is not efficient; many fish of marketable size are sold as scrap, and many small fish are not culled from those shipped to fresh fish markets. Fish dealers in the cities believe that this lack of attention to careful culling affects selling prices adversely.

Very little is known about butterfish, although it is a fairly important species from Chesapeake Bay north to New England. Perlmutter (1939), in the vicinity of Long Island, took young-of-the-year that ranged in total length from 2 to 94 mm. ($\frac{1}{10}$ to $3\frac{1}{2}$ inches) or 2 to 77 mm. fork length (fig. 7), and Bigelow and Schroeder (1953) estimated that fish caught off the New Jersey coast, ranging from 4 to $5\frac{1}{4}$ inches total length, were in their second year, and a group of larger fish, from $7\frac{1}{2}$ to $10\frac{1}{2}$ inches total length, were in their third summer, and some perhaps in their fourth. Hildebrand and Schroeder (1928) concluded that butterfish in Chesapeake Bay increased from a mean total length of 4 inches in May to about $5\frac{1}{4}$ inches in October. Spawning, as deduced from observations of gonad development, occurs in early summer in Chesapeake Bay. On this evidence we can assume that most butterfish in pound-net scrap in Virginia were in their second year of life, and most of those sold as food were in their third year or older.

Gray sea trout or weakfish (Cynoscion regalis):
Atlantic coast, 1957: 8,150,000 pounds, valued at $622,000.



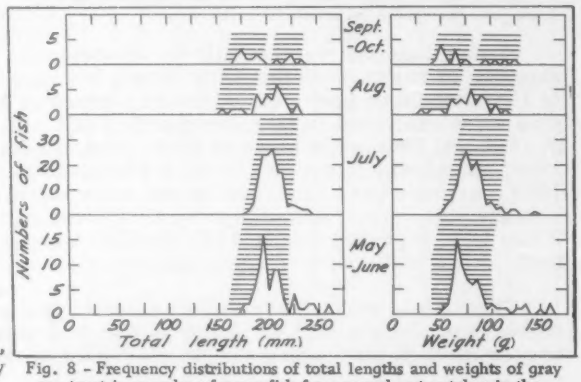
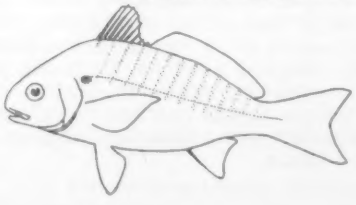


Fig. 8 - Frequency distributions of total lengths and weights of gray sea trout in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones emphasize the progression of size groups to the right as the season advances.

This was the second most important food fish in scrap samples examined. It occurred in about three-quarters of all samples, and ranked fourth of all species by weight. Sizes were fairly uniform, and most fish probably were in their second year of life (Nesbit 1954), with a few in their third year or older early in the season, and a few larger yearlings in late summer (fig. 8). In spring and summer many of these small trout contained well-developed gonads, and it seems probable that they would have spawned that season. By number, more than one-quarter of the gray sea trout catch in the York River fishery was discarded as scrap (table 4).

Spot (Leiostomus xanthurus):
Atlantic coast, 1957: 9,032,000 pounds, valued at $623,000.



Spot also was an important food fish in pound-net catches, and young appeared rather frequently in scrap. More than two thirds of of all scrap samples contained small spot, which almost equalled gray sea trout in numbers, although not in total weight. Spring catches contained two size groups of spot (fig. 9), probably fish in their second year and in their third

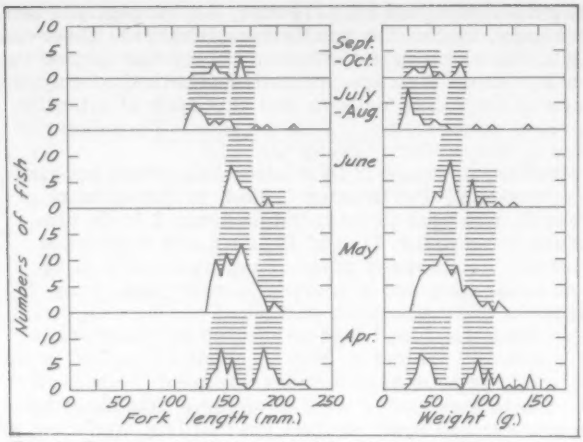
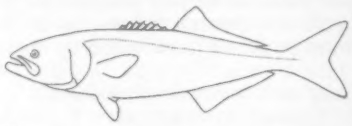


Fig. 9 - Frequency distributions of fork lengths and weights of spot in samples of scrap fish from pound-net catches in the York River area, Virginia, 1958. Shaded zones emphasize the progression of size groups to the right as the season advances.

year or older (Pacheco 1957). The relative abundance of larger and older spot in scrap at this season probably reflects small catches of this species, typical of the spring fishery. When only a few individuals of edible size were taken they were not saved for market. By midsummer most spot in scrap samples were young, nearing the end of their first year of life.

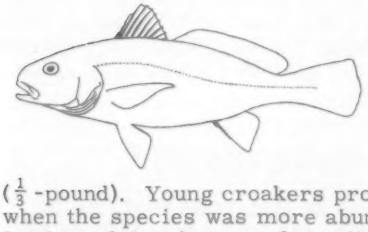
Bluefish (Pomatomus saltatrix):
Atlantic coast, 1957: 3,742,000 pounds, valued at $493,000.



Young bluefish were relatively important in 1958 samples of scrap from the York River, but less important in 1954. Their absence in 1955 may have been related to the pattern of sampling in that year for no samples were examined in late summer and fall. On the other hand, almost all bluefish in 1954 and 1958 were taken in May, June, or July, months equally well sampled in 1955. Bluefish are erratic in their movements, and their occurrence in the Bay in 1958 may have been governed by the same unusual temperature conditions that brought blue runner and bigeye scad to these waters in apparently unusual numbers. It has been reported that in 1958 bluefish were less abundant along the Middle Atlantic coast and appeared later than usual.

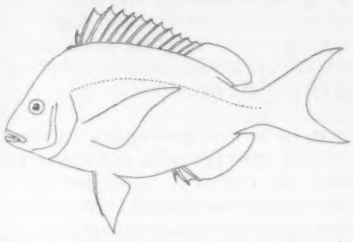
Bluefish in scrap were rather uniform in size, about 150 to 210 mm. (6 to 8 inches) fork length, and 45 to 125 g. ($\frac{1}{10}$- to $\frac{1}{4}$-pound). Average size tended to decrease through the fishing season, probably because younger fish appeared later.

Croaker (Micropogon undulatus):
Atlantic coast, 1957: 18,918,000 pounds, valued at $1,943,000.



Young croakers were encountered in 7 out of 21 scrap fish samples in 1954 and ranked eleventh in number. In 1955 they were found in only 2 samples out of 14, and in 1958 in only 3 out of 25, and ranked fourteenth in number in both years. Total lengths of 32 fish from scrap samples examined in 1955 and 1958 ranged from 145 to 245 mm. (6 to 9 inches) and weights reached a maximum of 165 g. ($\frac{1}{3}$-pound). Young croakers probably were more common in scrap in previous years when the species was more abundant, and their scarcity in 1958 was not unexpected in view of the absence of yearlings, born in fall and winter of 1957-58, from the waters of Chesapeake Bay and the estuaries in 1958, as observed by W. H. Massmann and his associates at the Virginia Fisheries Laboratory. Large catches of croakers were made in the spring of 1958, and it would be expected that small fish, if they had been present, would have been culled from these hauls.

Scup (Stenotomus versicolor):
Atlantic coast, 1957: 34,108,000 pounds, valued at $2,008,000.



This species does not enter Chesapeake Bay in great numbers, and most Virginia landings are caught in the ocean by trawlers. Nevertheless, a few are taken by pound nets in the lower part of the Bay, and some of these enter the scrap. Scup occurred in about 1 of every 4 samples examined in 1955 and 1958, but not at all in 1954. Catches were distributed more or less randomly through the fishing season, but there were striking seasonal changes in size and probably age of fish in 1958 (table 8). Those taken in June and July (fork length 4 to 5½ inches) probably were in their second year of life, those caught in fall (fork length 7 inches) probably in their third year.

Table 8 - Frequency Distributions of Fork Lengths and Weights of Scup (Stenotomus versicolor) in Pound-Net Scrap, York River, Virginia, 1958.

Fork Length mm.	Numbers of Fish			Weight G.	Numbers of Fish		
	June	July	Sept.-Oct.		June	July	Sept.-Oct.
				15	1	-	-
				20	1	-	-
				25	3	-	-
				30	2	-	-
				35	-	-	-
				40	-	-	-
				45	-	-	-
90	1	-	-	50	-	1	-
95	-	-	-	55	-	-	-
100	1	-	-	60	-	1	-
105	2	-	-	65	-	-	-
110	3	-	-	70	-	-	-
115	-	-	-	75	-	-	-
120	-	-	-	80	-	-	1
125	-	-	-	85	-	-	-
130	-	-	-	90	-	-	-
135	-	1	-	95	-	-	-
140	-	1	-	100	-	-	-
145	-	-	-	105	-	-	-
150	-	-	-	110	-	-	1
155	-	-	-	115	-	-	4
160	-	-	-	120	-	-	1
165	-	-	-	125	-	-	3
170	-	-	4	130	-	-	-
175	-	-	6	135	-	-	1
180	-	-	3	140	-	-	2

SUMMARY AND CONCLUSIONS

Many other species, some valued as food, others of little appeal, occurred in relatively small quantities in pound-net scrap (tables 1 to 7). If our examination of samples from the York River was at all representative, none of these minor species is caught in sufficient quantity to offer any great threat to the resource, but catches of some others, particularly butterfish, gray sea trout, and spot, are sufficiently large so that investigation of the effect of such removals upon future stocks of adult fish would be desirable. Some of the investigations now under way at the Virginia Fisheries Laboratory are laying the groundwork for solution of this problem.

It is pertinent to ask whether scrap fish now caught by pound nets and other fishing gear in Virginia are being put to best economic use. As long as there is no great shortage of protein food in the United States, preferences and prejudices will control economic value of fish to a great extent, but it appears that much of the choice as to whether a fish is scrap or human food rests with the primary producer or the middleman, and the consumer has little or no opportunity to choose. One cannot help but wonder whether some enterprising middleman might not profit, and the consumer benefit also, by experimental marketing of some of the scrap fish we have described, like blue runner, bigeye scad, silver perch, or hogchoker. It seems to be established that these fishes are quite palatable, and ojections on the basis of size seem rather incongruous when such species as butterfish, equally small, apparently are in great demand. Displayed in attractive packages, as frozen-dressed panfish, irrespective of species, these now-despised varieties might find a ready market. Economic effects of fluctuations in abundance of individual species would be minimized by selling under a general, rather than a specific, name, and other species that appear only spasmodically might be marketed equally well.

One rather formidable obstacle to development of methods to allow small fish to escape the nets, or to utilize scrap for human food, is presented by the crab-pot

fishery. Demand for scrap as bait is so strong that at times we were unable to secure samples for scientific study. Yet there are several ways in which a steady and more convenient supply of bait could be provided, e. g. by freezing menhaden in blocks of suitable size, or developing a prepared bait of uniform quality and high attraction power. If such developments are not forthcoming there may be no unanimous support for scientific measures designed to create an optimum sustained yield of food fishes, no matter how well-founded such measures might be.

Some of the conclusions drawn in this investigation may be too sweeping in view of the limited area of sampling and the knowledge that many species are not distributed uniformly through the waters exploited by the pound-net fishery. Catches in other areas certainly should be examined if this study is to continue, and it would be well also to secure information on relative quantities and species composition of scrap taken in haul seines and other gears.

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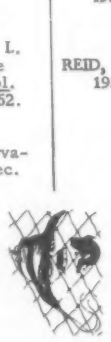

POSSIBILITIES FOR APPLYING FISH OIL TO ORE FLOTATION

By M. E. Stansby*

ABSTRACT

This is a report of a trip made to iron-ore-concentration plants in Michigan and Minnesota for the purpose of learning what possibilities there are for using fish oils in the flotation of ore.

INTRODUCTION

In an attempt to apply fish oils or fish-oil derivatives to the flotation of ores, especially iron-ores, the U. S. Bureau of Commercial Fisheries has been carrying on cooperative research since 1955 with the School of Mines and Metallurgy, University of Minnesota. Results of this research have shown that fish-oil fatty acids can be highly effective for such flotation. With iron ore, fish-oil fatty acids (because of their high degree of unsaturation) are especially effective in a reverse type of flotation in which the silica is floated away from the iron in place of the more usual flotation of the iron from the silica.

Fig. 1 - Experimental ore flotation employing fish-oil fatty acids is being carried out at School of Mines and Metallurgy, University of Minnesota.

The principal deposits of iron ore in the United States are located in Minnesota and in northern Michigan, with the deposits in Minnesota being the more important. In June 1959, a visit was made to several iron-mining concerns and their research laboratories in Michigan and Minnesota. The objectives of this visit were: (1) to learn whether or not the flotation process for concentrating iron ore is being expanded and, accordingly, whether or not the possibility of using fish oils as flotation agents is increasing and (2) to engender further interest by the iron ore-concentration industry in the Bureau's fish-oil research program, possibly to the extent that the research laboratories of the industry might investigate the use of fish oils.

The purpose of this report is to describe the findings of this trip and to inform the fish-oil industry of future possibilities for marketing their product for the flotation of ore.

EARLY USE OF FISH OIL IN ORE FLOTATION

It has been known by Bureau personnel and the fish-oil industry that many years ago fish oils were employed as flotation agents for concentrating various ores, but no specific details were available.

From a metallurgist at one concern, information was obtained on such early use of fish oils at a phosphate-flotation plant in Florida that had for many years been using menhaden and sardine fatty acids. In 1937, however, the price of fish-oil fatty acids reached about 12 cents a pound, which the management considered to be too expensive for their operation. They therefore looked into the use of tall-oil fatty acids, which had been tried earlier without success. Since tall oils in 1937 were selling for only about 2 cents a pound, research was carried out with them

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and, eventually, a way of using tall oils was found. This concern then changed from fish-oil to tall-oil fatty acids.

In 1938, another concern, in Cuba, who employed this same metallurgist, used fish-oil fatty acids for the flotation of manganese ore. In that year this concern changed to tall-oil fatty acids because the latter was much lower in price.

MICHIGAN IRON ORES

In Marquette County, Mich. (on the upper Michigan peninsula), specular hemetite ores, or specularite, were mined extensively from 1871 to 1937. By the latter date, most of the ores of higher grade had been exhausted, and many mines were abandoned. In 1947, a large iron-mining company began investigation of the possibility of reclaiming, by flotation, some of the lower grade iron ores still available in this region in large quantities. Eventually a joint operation was set up by several large iron-mining concerns. A small plant with a capacity of 300,000 tons of concentrate a year was opened at Humboldt, Mich., followed shortly, in 1956, by construction at Republic, Mich., of a plant with a capacity of 600,000 tons a year. The capacity of the Humboldt plant is now being doubled, and that of the Republic plant is being considered for doubling.

In addition to these two, a concentration plant with a capacity of 750,000 tons a year is operated by another company at Groveland, Mich. Much of the output of this plant is concentrated by spiral gravity methods, but a part of the output is concentrated by flotation.

As an example of the quantity of fatty acids used in these operations, one plant uses 1.2 to 1.5 million pounds annually.

SPECIFICATIONS FOR FLOTATION AGENTS: Several desirable characteristics for fatty acids to be used for flotation of iron ore were mentioned by industry personnel. A low titer (concentration of a substance in solution) is desirable, preferably 1° to 6° C. (33.8° - 42.8° F.). The desirable iodine value will depend upon the particular flotation process employed. At the Republic plant, values between 110 to 140 were considered optimum; some success had been obtained with fatty acids having iodine numbers as low as 100, but the higher range is considered to be preferable. The Republic and Humboldt plants currently are using tall-oil fatty acids as flotation agents.

POSSIBILITY FOR MARKETING FISH OILS FOR MICHIGAN SPECULARITE FLOTATION: Michigan specularite ores are relatively easy to float, so the choice of agent to obtain selective flotation does not appear to be critical. It was for this reason, undoubtedly, that flotation was applied on a large scale to these ores, since little research in finding a flotation procedure was required. Because the characteristics of potential flotation agents are not critical, the principal item that purchasers of these materials are apt to consider is price. Fish-oil fatty acids that can be prepared and sold at prices competitive to tall-oil fatty acids (currently selling at $7\frac{1}{4}$ to $8\frac{1}{2}$ cents a pound f.o.b. factory in Florida or West Virginia, with cost of transportation adding $1\frac{1}{2}$ to $1\frac{3}{4}$ cents a pound to these costs) should have a good chance for use in the ore-flotation industry. These prices are less than those at which most fish oils are currently selling. Some fish oils that are selling at 4 cents a pound, however, could very likely be processed to fatty acids and still be competitive with tall oil. This is particularly true if the bulk (nonfractionated) fatty acids can be employed with these types of ores and if the fish-oil fatty acids are found to be highly efficient. The Bureau is running tests on the efficiency of bulk fatty acids from some of the cheaper fish oils for specularite flotation and consequently for possibly greater recovery of this highly important and strategic American resource.

The possibility that the odor of fish oil would be objected to by the ore industry remains to be settled. Direct inquiry as to whether this would be a factor resulted in negative replies. One metallurgist who 25 years ago used fish-oil fatty acids for flotation said that he never had any complaints based upon odor during his use of those materials. Others in the field of iron-ore concentration stated that they would anticipate no serious drawback to the use of fish-oil fatty acids based upon odor. In contrasting to this opinion is the fact that at a commercial flotation plant one of the metallurgists pointed out the lack of odor in the tall-oil fatty acids and commented unfavorably on the odor of some fish-oil fatty acids with which he had been experimenting.

MINNESOTA IRON ORES

NONMAGNETIC TACONITE ORES: The Mesabi Range in Minnesota has been the principal source of iron ore in the United States for many years. It has contained relatively large quantities of high-grade iron ores that can be used without concentration, but they are approaching exhaustion. The high-grade ores are mixed with much vaster quantities of lower grade ores, which are just starting to be concentrated by a magnetic process. Two huge magnetic-process plants costing several hundred million dollars each are now in operation. Not all of the ores of lower grade in the Mesabi Range can be used in this magnetic process, since only the taconite ores possessing magnetic properties are suitable. A considerable quantity of nonmagnetic taconite ore is available, some of which has considerably higher iron content than have the magnetic ores presently being utilized. Furthermore, many millions of tons of these nonmagnetic taconite ores of relatively high iron content have been shoveled away from the surface in order to get at the ores of higher grade beneath. These intermediate-grade nonmagnetic taconite ores are placed in piles containing as much as 7 million tons awaiting the time when they can be concentrated.

In addition to the problem of how the nonmagnetic taconite ores could be concentrated, a more serious barrier to such use has existed. Iron ores are a low-priced commodity, worth only about 7 dollars a ton at the mine. Of this amount, sometimes as much as 2 dollars a ton or more has to be paid for various state taxes. A special concession was made by the State of Minnesota in the case of the magnetic taconite ores of very low iron content whereby most of those taxes were waived in order to permit the ores to be utilized. No such tax concession has existed for the so-called semitaconite ores, including the nonmagnetic type. Until those taxes were waived, the cost of any type of concentration was far in excess of what was economically feasible.

The Legislature of the State of Minnesota in June 1959 altered the tax laws to place the nonmagnetic semitaconite ores in the same preferred tax class as the magnetic taconites. Thus, for the first time, the utilization of this type of ore is feasible.

Two means are available for concentration of the nonmagnetic taconites. They can be roasted and thereby converted to the magnetic form, which can be magnetically concentrated, or they can be subjected to flotation. Flotation is the simpler, possibly cheaper process. Yet it has the disadvantage that some of the nonmagnetic taconites are not readily separated by the usual flotation processes, so the choice of the best flotation agent may be highly critical. Current research with fish oils in flotation of these nonmagnetic semitaconite ores should show whether fish oils are sufficiently efficient to warrant their use.

In June 1959, personnel at two concerns were definitely planning to concentrate nonmagnetic taconite ores. Neither concern was ready to go into operation even on a pilot-plant scale, for they were still carrying out laboratory investiga-

tions. One of these firms seemed to be inclined toward flotation rather than roasting; the other one was inclined toward roasting but had not made a final decision.

It would seem that fish-oil fatty acids might have a better chance for application as ore-flotation agents in the concentration of Minnesota nonmagnetic taconites than in the concentration of Michigan specularites, owing to the greater importance in the former case of the efficiency of the reagent. At present, however, there are no plants operating a flotation plant for the nonmagnetic taconites, so this is a possibility contingent upon favorable future developments.

MAGNETIC CONCENTRATES: Another possibility for future application of fish oils in ore flotation would occur if future developments in the iron-ore industry should require a further removal of silica from the iron-ore concentrate than is possible by magnetic methods. The iron and steel industry has been requiring ore of lower and lower silica content. If this trend continues, a point will eventually be reached where the only possibility for achieving the required low content of silica will be to use flotation after magnetic concentration. One of the operators of plants for the magnetic separation of iron ore is convinced that this use of flotation will eventually be adopted.

For such a use, the inverse process employing fish-oil fatty acids would be ideal. In the inverse flotation procedure, silica is floated from the iron ore. Because silica is already quite low in a magnetically-concentrated ore, this inverse process would be the most efficient way to effect the separation.

This combined magnetic and flotation concentration of ore will not be adopted in the near future. Therefore, there is no immediate possibility of selling fish oils for such a process. If, however, this procedure becomes a reality, it is likely to offer the greatest possibility for introducing fish oils into ore flotation.

NONFERROUS ORES

Although most of the research in the Bureau's cooperative program with the University of Minnesota's School of Mines and Metallurgy has dealt with iron-ore flotation, some preliminary tests with nonferrous ores indicate that fish oils might have application in the flotation of other materials. For example, good results were obtained in flotation of fluorite ores. Since flotation is more firmly established as a concentration method for nonferrous ores, the fish-oil industry should not overlook the possibility of marketing their oils for such nonferrous flotation purposes.

SUMMARY

1. Problems in concentrating iron ore vary enormously from one geographical area to another. Consequently, the possibilities for applying fish oils as flotation agents differ in the various ore-producing areas.

2. Possibilities for applying fish oils to flotation depend on whether the present or the future is being considered. For the present, fish oils may have little advantage over other ore-flotation agents, since price appears to be the factor determining the choice of agent used. If the future is considered, however, possibilities for the use of fish oils are greater, since there is likelihood that they will be evaluated on the basis of the efficiency of their action rather than on the basis of their price.

3. Flotation is an expanding means for concentration of Michigan specularite ores, and three plants are in commercial production. This ore is highly amenable, however, to being concentrated by flotation. Probably only the currently cheapest fish oil would have a chance for use.

4. Owing to changes made in June 1959 in Minnesota tax laws, it now has become feasible to consider concentration of certain nonmagnetic taconite ores. Although these ores are much more difficult to float than the Michigan specularite ores, many leaders in the iron-ore concentration industry are considering flotation operations. In these difficult operations, fish oils may well have advantages.

5. It is the view of some leaders in the industry that the magnetically-concentrated iron ore may eventually have to be further concentrated. Personnel in one of the concerns currently operating huge magnetic concentration plants tend to the view that in some years hence flotation will be used in conjunction with magnetic concentration. In such an operation, the use of fish oils in the reverse process where silica is floated from the iron ore may present the best possibility.

6. Need exists for the fish-oil industry to further acquaint the iron-ore industry with the properties of fish oil that might be useful in the flotation of iron ore.

7. The possibilities for applying fish oils as ore-flotation agents in noniron-ore concentrations should not be overlooked. These possibilities include, for example, the use of fish oil in the flotation of phosphate and fluorite ores.

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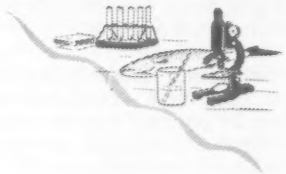

LOBSTER'S PROTECTIVE SYSTEM

If a lobster is seized by the claws, it can throw off the arms bearing the claws at a point between the second and third segments of the arms. If the shell on some part of an arm is crushed and the lobster is bleeding, it will often cast off its claw at this point. At the joint between the second and third segments of the arm the claw breaks off easily and there is a special arrangement for preventing bleeding. However, if the arm is broken in some other spot much bleeding occurs. After the old claw is thrown off a soft bud grows out from the second joint of the arm, and when the lobster molts the new claw increases greatly in size and becomes covered by a shell. It takes three or four molts, however, for a new or regenerating claw to reach its normal size again.

The smaller legs also may be cast off but not so readily as the large claws. These small legs and other appendages, such as the feelers and the swimmerets, also can be regenerated.

COMPOSITION OF FISH AND SHELLFISH

In the composition studies conducted in 1959 at the U. S. Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash., major attention was given to marine fish of the Pacific Coast. One study on meals was completed, and plans have been made to start the investigation of shellfish beginning with Dungeness crab.

Three investigations have been completed. The work on halibut showed it to be uniformly low in both oil and sodium and high in protein. A survey of the sodium content of fish meat indicates that salt-water fish in general are not significantly higher in sodium content than are fresh-water fish provided they have not been in contact with brine or other sources of sodium.

In a study of fish meals, it was found that the carbonate content was less than 2 percent and ranged as low as 0.5 percent. Shellfish meals on the other hand showed large variations, reaching 25 percent for shrimp and 75 percent for clams. The first two reports were presented at national meetings of scientific associations and all three have been submitted for publication.

Three projects are nearing completion. A long-term study of Pacific ocean perch and several other species of rockfish show a uniform composition regardless of species, season of capture, and area of capture. A similar study on sole, including 10 species, shows a wide variation in composition. They are much lower in protein and higher in sodium than are rockfish. Much of the analytical work for the Terminal Island project on a sampling method for tuna was done in this laboratory.

Three other projects are well under way or planned for the near future. The composition of tuna is being studied. Two series of albacore, one of skipjack, and several bluefin and yellowfin specimens have been analyzed. Of all fish tested, tuna meat is highest in protein and lowest in sodium, but it shows a large fluctuation in oil content. A proposed three-year program on the study of silver salmon has been started. Samples have been prepared from 4 series of specimens obtained during the 1959 fishing season. Plans have been made to start investigations on the composition of shellfish, beginning with Dungeness crab in January.

CONTROL OF DRIP IN CHILLED AND FROZEN FISHERY PRODUCTS

Free liquid or juice that exudes from fishery products during refrigerated storage or during the defrosting of the frozen product may be (1) water native to the product, (2) water picked up during handling and processing, and/or (3) water added as a protective glaze. When present in excessive amounts, the free liquid may become a problem to the fish producer, buyer, and consumer. The general objectives

of this project are to investigate the factors that affect water retentivity of various frozen fishery products and to find means of determining the amount of native water in contrast to amounts of water picked up during processing or added as glaze.

The first phase consists of determining some of the constituents of thaw drip or juice that exudes from defrosted cod fillets that have been frozen and stored for various time intervals at 0° F. and +20° F. The constituents being determined include total solids, total nitrogen, protein nitrogen, ash, sodium, potassium, calcium, phosphorus, magnesium, and sulfate. Results are still insufficient to draw any conclusions at this time.

FISH FLOUR RESEARCH

For research being conducted on fish flour at the Bureau's Technological Laboratory, College Park, Md., samples of whole fish, fillets, and the remaining fillet waste were obtained from a single lot of ocean perch. These samples were frozen separately and half of each was processed into fish flour by an acid precipitation technique. The remaining half of each of the samples was processed into fish flour by an azeotropic distillation technique by the VioBin Corporation at Monticello, Ill.

The ocean perch fillets first were ground while still frozen and then were processed into a coarse, dry form in the pilot plant. This material then was extracted three times with a patented solvent, dried thoroughly in an air stream, autoclaved, dried again, and milled. This process was repeated using the whole fish and then again using the fillet waste.

Samples of each of the flours were taken aseptically during the final drying stage for bacteriological analyses. Total plate counts and E. coli determinations will be conducted to aid in evaluating the "sanitary condition" of the product.

The fish flour pilot plant is only one of the installations of the VioBin Corporation at Monticello. There is a commercial-scale batch fat extractor for the final defatting of dried beef pancreas, beef liver, and fish meal. Each of the above products first is dried using the azeotropic processing technique either in the pilot plant at Monticello or in one of several other plants. The beef products are sold to pharmaceutical houses for the preparation of enzymes, etc., and the latter product is milled and sold as fish flour. Fish flour made from fish fillets is sold to pharmaceutical houses and all other fish flours are sold for export. Apparently there is at least a limited market for fish flour at the present time.

--By Caroline H. Kurtsman,
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U. S. Bureau of Commercial Fisheries,
College Park, Md.

LOW STORAGE TEMPERATURES HELP MAINTAIN FILLET QUALITY

Frozen pollock fillets lose quality very rapidly at high storage temperatures, according to a preliminary report from the U. S. Bureau of Commercial Fisheries Technological Laboratory in Gloucester, Mass.

Temperatures of +10°, 0°, and -20° F. have been used in tests on one-pound packages of pollock fillets. The fillets became completely inedible in less than two

months when stored at 10° F. At 0° F. this product had a storage life of about six months, or more than three times that of the fillets stored at the higher temperature. At lower temperatures the keeping quality is increased even more significantly. For example, pollock fillets stored at -20° F. for six months showed no measurable change in quality.

The results of these tests, which are still in progress, emphasize again the importance of storing fish at temperatures of 0° F. or lower in order to insure the marketing of a high quality product. Also, the results show that the necessity for low-temperature storage increases as the length of the storage period is increased.

PROPOSED STANDARDS FOR GRADES OF FROZEN RAW HEADLESS SHRIMP UNDER REVIEW

Two series of industry meetings were held during October 1959 with producers, users, and marketers of frozen raw headless shrimp, and scientists of the U. S. Bureau of Commercial Fisheries to discuss the first draft of the proposed standards for Federal grade of frozen raw headless shrimp. The first meetings were held in Brunswick, Ga., and Tampa, Fla. Two weeks later, meetings were held in New Orleans, La., and Corpus Christi, Tex. Approximately 40 industry members attended the four meetings.

The spirited discussion of the draft of the proposed standards provided the background needed for further revision. A new working draft, along with a draft copy of Instructions to the Inspector, was sent out to the 16 Bureau inspectors working in shrimp breading plants. Through the cooperation of these inspectors and of the plants in which they are stationed, the standard can be given a thorough in-plant application and evaluation prior to the preparation of the final draft.

It was expected that the provisional draft would be ready for publication in the Federal Register during February 1960.

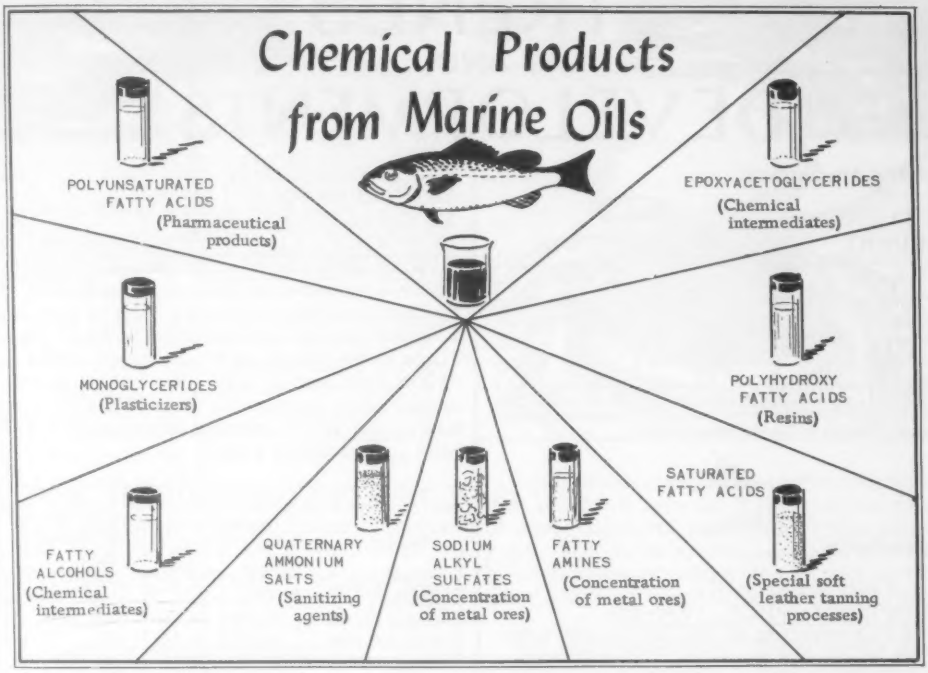
PURIFIED FISH-OIL FRACTIONS TO BE MADE AVAILABLE FOR RESEARCH

Following up successful research findings by the U. S. Bureau of Commercial Fisheries on the usefulness of fish-oil fractions in reducing high blood-serum cholesterol levels in animals, Assistant Secretary of the Interior Ross Leffler announced on December 29, 1959, the details of a stepped-up research and technical assistance program.

He explained that the plans include making available to interested medical and pharmaceutical researchers relatively large samples of purified fish-oil fractions and the screening of 25 species of edible and industrial fish to determine whether the types of fatty acids present in those fishes are those useful in dietary and medical treatment of elevated cholesterol levels.

Other investigators are studying the effects of highly unsaturated oils on fat utilization by the body as well as the amount of dietary fish oil necessary to cause a useful reduction in serum-cholesterol levels. Nutritional advisory services by the Bureau on fish oils and edible fish products are being made freely available to dieticians and medical researchers engaged in formulation of special anticholesterol diets.

The Director of the Bureau stated that his staff has received many expressions of interest from researchers in utilizing fish oils and fishery products for human



feeding trials. Large quantities of these oil fractions have not been available. To remedy this situation, the Bureau is undertaking the preparation of such oil fractions utilizing a pilot-scale centrifugal molecular still and will make oil samples available, free of charge, to responsible researchers.

The key findings of recent research which the Bureau hopes will encourage full-scale clinical testing by responsible medical staffs are (1) the abundance of what are known as "unsaturated" fatty acids in the body oils of many species of fish, (2) proof that the feeding of these "unsaturated" fatty acids to test animals reduced the highly elevated content of cholesterol in their blood sera to "normal" levels, and (3) that the more "unsaturated" the fatty acid used, the more effective it was in normalizing levels of serum-cholesterol.

This latter finding was of most immediate interest to fishery researchers since fish-oil fatty acids contain up to six points of unsaturation as compared to two points of unsaturation in linoleic acid, the active cholesterol-depressant agent in vegetable oils. Use of a properly prepared concentrate of these highly unsaturated fatty acids from fish would permit effective anticholesterol treatment with a minimum of added fat intake.

Bureau technologists pointed out that these unique "soft fat" features of fish oils make fishery products especially valuable for inclusion in diets designed to bring about a better nutritional "balance" between the hard and soft fats in the American diet. Many medical authorities have pointed out the desirability of increasing soft fat consumption while reducing the consumption of hard fats as a possible means of controlling blood-cholesterol levels.

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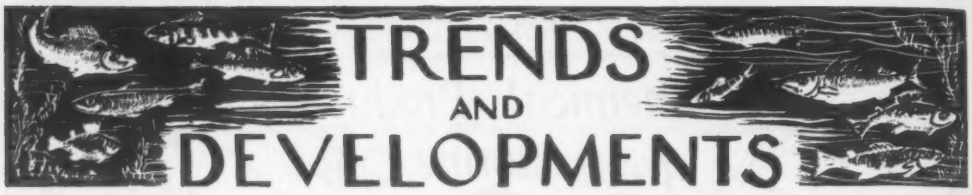


American Samoa

TUNA LANDINGS, JANUARY-NOVEMBER 1959:

Species	November		Jan.-Nov.	
	1959	1958	1959	1958
	(1,000 Lbs.)			
Albacore	2,460	1,712	19,819	19,799
Yellowfin	161	239	3,779	4,924
Big-eyed	93	42	919	1,007
Skipjack	7	-	14	-
Total	2,721	1,993	24,531	25,730

Note: Most of these tuna were landed by Japanese vessels; a small amount by South Korean vessels.

Byproducts

U. S. FISH MEAL AND SOLUBLES SUPPLY, 1950-59:

The production of 385,000 short tons of fish meal and solubles in the United States plus imports of 144,500 tons of fish solubles added up to a record supply in 1959. The United States production in 1959 was 31.5 percent above the 10-year average (1950-59), and imports exceeded the average by 19.8 percent. The overall supply (United States production plus imports) was 28.1 percent above the 10-year average for the 1950-59 period.

Table 1 - U. S. Supply of Fish Meal and Solubles, 1950-59

Year	U. S. Production 1/		Imports 2/		Total
	Short Tons	Percent	Short Tons	Percent	Short Tons
1959 3/	385,000	72.7	144,500	27.3	529,500
1958	313,228	74.3	108,383	25.7	421,611
1957	325,221	79.0	86,442	21.0	411,663
1956	360,207	79.6	92,093	20.4	452,300
1955	319,962	76.3	99,544	23.7	419,506
1954	314,482	68.0	147,777	32.0	462,259
1953	238,851	64.5	131,473	35.5	370,324
1952	221,403	52.1	203,539	47.9	424,942
1951	209,756	62.0	128,478	38.0	338,234
1950	239,954	79.0	63,855	21.0	303,809

1/Includes homogenized-condensed fish and fish solubles.
2/Includes fish solubles
3/Partly estimated.
Note: Wet weight of solubles and homogenized-condensed fish have been converted to dry weight by reducing their poundage by one-half.

* * * * *

U. S. IMPORTS OF FISH MEAL, AND FISH SOLUBLES, JANUARY-OCTOBER 1958-59:

Fish Meal: United States imports of fish meal during the first 10 months of

U. S. PRODUCTION OF FISH MEAL, FISH SOLUBLES, AND HOMOGENIZED-CONDENSED FISH:

Fish Meal, 1958-59: Based on partially-estimated production statistics, the United States production of 295,000 tons of fish meal in 1959 will be close to the previous record production of 295,793 tons in 1956. Fish meal produced from menhaden in 1959 (219,000 tons) was up about 4.0 percent from the 210,582 tons produced in 1956.

Table 2 - U. S. Production of Fish Meal, 1958-59

Product	1959 1/	1958	Record Production Prior to 1959	
	Short Tons	Short Tons	Year	Short Tons
Herring, Alaska	8,440	6,253	1937	18,816
Menhaden	219,000	158,074	1958	210,582
Sardines, Pacific	2,560	10,756	1936	121,739
Tuna & mackerel	21,000	25,311	1956	26,266
Other	44,000	47,746	-	-
Total	295,000	248,140	1956	295,793

1/Partly estimated.

Fish Solubles and Homogenized-Condensed Fish, January-October 1958-59: Production of fish solubles and homogenized-condensed fish during the first 10 months of 1959 of 167,602 tons was up 45.8 percent from the 144,984 tons produced in the same period of 1958.

Table 3 - U. S. Production of Fish Solubles and Homogenized-Condensed Fish, January-October 1958-59

January-October		Record Production Prior to 1959	
1959 1/	1958		
(Short Tons)			Short Tons
167,602	114,984	Year 1958	130,177

1/Preliminary.

* * * * *

1959 of 123,744 tons were up sharply from the 85,780 tons imported during January-October 1958. The leading

Table 4 - U. S. Imports of Fish Meal by Countries, January-October 1958-59

Country	January-October 1959 1/	January-October 1958	Record Imports Prior to 1959	
	Short Tons	Short Tons	Year	Short Tons
Canada	35,533	20,649	1956	57,127
Peru	46,622	31,955	1958	33,371
Chile	4,995	6,200	1958	8,160
Angola	20,738	16,691	1953	33,589
Union of So. Africa	7,852	5,142	1952	37,523
Norway	141	1,184	1952	50,181
Other countries	7,863	3,959	-	-
Total	123,744	85,780	1952	203,539

1/Preliminary.

supplier of fish meal to the United States during the first 10 months of both 1958 and 1959 was Peru, followed by Canada and Angola. Peru, Canada, and Angola supplied about 83.2 percent of the United States imports in the first 10 months of 1959 and about 80.9 percent during the same period of 1958.

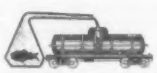
Fish Solubles: United States imports of fish solubles January-October 1959 jumped 268.5 percent from the January-October 1958 imports. Denmark increased shipments of fish solubles to the United

Table 5 - U. S. Imports of Fish Solubles, January-October 1958-59

Country	January-October 1959 1/	January-October 1958	Record Imports Prior to 1959	
	Short Tons	Short Tons	Year	Short Tons
Canada	1,345	1,815	1957	4,024
Denmark	17,606	6,044	1958	9,943
West Germany	1,705	2/	2/	2/
Union of S. Africa	1,653	551	1958	1,063
Other Countries	812	110	2/	2/
Total	23,121	8,520	1958	14,567

1/ Preliminary. 2/ Data not available.
Note: Imports from the Union of South Africa are believed to be on a dry-weight basis. All others are understood to be on a wet basis.

States during January-October 1959 as compared with the same period of 1958 by 243.3 percent.



California

BIOLOGISTS PREDICT NORMAL STOCKS OF DUNGENESS CRAB:

The California Department of Fish and Game stated on December 18, 1959, that fewer Dungeness crabs were caught off San Francisco in 1959 as compared with 1958, but the 1958 catch was above average. The crab catch in 1958 totaled about 5 million pounds, while the average catch for the central coast is $3\frac{1}{2}$-4 million pounds.

Dungeness crab

California marine biologists report that the crab harvest fluctuates because of environmental conditions from year to year. It may even decline naturally over a succession of years, but this does not indicate the resource is being fished out.

On their research cruise before the 1959 season opening, Department of Fish and Game personnel found many crabs just under legal size. These will be of legal size in 1960, indicating that the resource is healthy.

The Department's research crew made a cruise off the Eureka area in November and reported that the season there, which opened December 15, 1959, should be good. There were good numbers of crab, but the research vessel did not find any unusually large "jumbo" crabs, as have been found in some previous years.

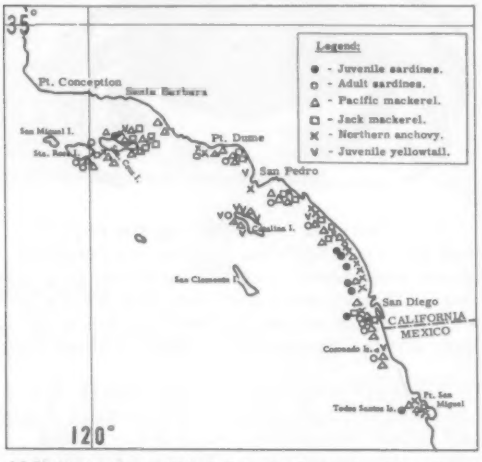
* * * * *

PELAGIC FISH POPULATION SURVEY OFF COAST OF SOUTHERN AND CENTRAL CALIFORNIA CONTINUED:

M/V "Alaska" Cruise 59A8-Pelagic Fish: The coastal waters and islands of southern California from Santa Barbara to Todos Santos Bay, Baja Calif., was surveyed (September 21-October 10, 1959) by the California Department of Fish and Game research vessel Alaska

to sample young sardines for determining the relative abundance and distribution of fish resulting from the 1959 spawning.

Other objectives were to sample adult sardines, Pacific mackerel, jack mackerel, and anchovies to determine their relative numbers, their distributions, and their ages; and to collect live sardines for aquarium experiments conducted by the California Academy of Sciences.



M/V Alaska Cruise 59A-8-Pelagic (September 21 to October 10, 1959).

Pacific mackerel were taken at 38, sardines at 19, anchovies at 19, and jack mackerel at 16 of the 112 night light stations occupied.

Eight of the 19 sardine samples consisted of the 1959 year-class. These fish were smaller than normal for this time of year ranging from 43 to 115 mm. ($1\frac{3}{4}$-$4\frac{1}{2}$ inches). Most were taken between San Diego and Carlsbad. They were lightly mixed with anchovies. Most of the adult sardine samples were collected in the vicinity of San Diego and the Channel Islands. Several light stations were occupied close to commercial vessels actively netting sardines, but no fish were attracted to the lights.

Pacific mackerel were present throughout most of the area and were taken on 34 percent of the stations. The percentage of successful stations for Pacific mackerel was one of the highest recorded for surveys in this area. The dominant size group averaged about 260 mm. ($10\frac{1}{4}$ inches) fork length.

Large anchovies ranging from 120 to 162 mm. ($4\frac{3}{4}$ to $6\frac{3}{8}$ inches) in length were taken at San Diego and Santa Cruz Island. Fish of this size have been scarce in the southern California live-bait fishery for the past two years.

Bioluminescence ranged from fair to poor for visual scouting. In 444 miles of scouting, 20 schools were sighted--6 were identified as Pacific mackerel, 6 as anchovy, 4 as bonito, and 4 were unidentified.

A total of 32 juvenile yellowtail was collected at 11 stations off the Coronados, Santa Catalina and Santa Cruz Islands, and along the mainland off Dana Point and Rocky Point. These fish ranged in length from 84 to 160 mm. fork length ($3\frac{1}{4}$ to $6\frac{1}{4}$ inches) and probably represented successful spawning of yellowtail off southern California.

Several specimens of the sharpchin flyingfish, Fodiator acutus, were taken on 3 stations between Carlsbad and Dana Point. This species is rare this far north.

Approximately 50 live sardines were delivered to Marineland of the Pacific for aquarium experiments being conducted by California Academy of Sciences.

Sea surface temperatures ranged from 16.7° C. (62.1° F.) at Port Hueneme to 20.9° C. (69.6° F.) at Todos Santos Bay. The average temperature north of Point Dume was 19.2° C. (66.6° F.) and 19.7° C. (67.5° F.) south of the point.

Airplane Spotting Flight 59-17-Pelagic Fish: The inshore area from the Tijuana River to Fort Ross was surveyed from the air (October 13-16, 1959) by the Department's Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools.

Weather and visibility varied from excellent north of Santa Monica Bay to very poor south of that point. Because

of low clouds, smog and haze, only spotty observations were possible south of Point Dume. No fish schools were seen.

Conditions for aerial observations were very good between Point Dume and Point Arguello, but only 6 schools (all bonito) were observed. They were about one mile offshore between Gaviota and El Capitan. All were quite large, and moving slowly in a "mill" formation.

In San Luis Obispo Bay 55 poorly defined anchovy schools were scattered around the Avila piers in 2 to 4 fathoms of water. No other fish schools were seen south of Monterey Bay.

A total of 73 anchovy schools was counted in Monterey Bay. All were between the mouth of the Pajaro River and Santa Cruz Point inside the 10-fathom contour. Although not positively identified, 90 additional schools were seen in the Bay. These were mostly very large and deep and centered about 3 miles south of Needle Rock Point. An additional 15 very large unidentified schools were observed 2 miles northwest of Ano Nuevo Point.

Many small, fragmentary, anchovy spots were found between Ano Nuevo Point and Pescadero Creek. Also present in the area were: a large number of unidentified non-schooling fish, several large "pods" of sea lions, thousands of gulls, and 12 large basking sharks. The unidentified fish seemed to overlay the entire area and appeared to be about 12 inches in length, pale milky-gray in color and quite slow in their movements. The various groups of sea lions contained many hundreds of individuals, some of which seemed to be actively feeding while others were moving leisurely in the general direction of Ano Nuevo Point. The 12 large basking sharks were very close to shore off Pescadero Creek.

Only 11 anchovy schools were spotted north of Pescadero creek--10 over Four Fathom Bank just north of the Golden Gate, and one was one-half mile off Point Reyes Beach.

The water in the extreme inshore area from Pedro Point to Bodega Head was extremely dirty ranging from gray-green to a dark purple-brown.

* * * * *

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED:

Airplane Spotting Flight 59-18-Abalone: The Channel Islands were surveyed from the air on October 23, 1959, by the California Department of Fish and Game Beechcraft to observe locations and numbers of commercial abalone diving boats.

Four diving boats were observed in operation at Santa Rosa Island in the vicinity of Johnson's Lee where red abalone (Haliotis rufescens) predominate.

Three diving boats were observed at Seal Cove on San Clemente Island. In addition to these conventional diving boats a mothership and four skiffs were observed at this location. This is the first time a skiff-type of operation, which utilizes hookah-type diving gear instead of "hard hat" has been observed among the Channel Islands.

Kelp growth showed considerable increase along the west coasts of Santa Rosa, San Clemente, and Santa Cruz Islands since the last observation flight September 20, 1959.

Observations were confined to Santa Cruz, Santa Barbara, Santa Catalina, and San Clemente Islands. Clearance could not be obtained from the military to fly over Anacapa and San Miguel Islands and fog obscured San Nicolas Island. (See chart p. 30.)

Airplane Spotting Flight 59-19-Abalone: The shoreline from Ft. Bragg to San Francisco was surveyed from the air by the Department's Cessna 182 to estimate the numbers of abalone sport fishermen, clam diggers, and shoreside sport anglers.

Observations were not complete as 2 small sections of coast were blanketed by tongues of fog extending over the coast from a solid bank at sea. One was the 6-mile section of coast from just below Big River to just north of Albion. The

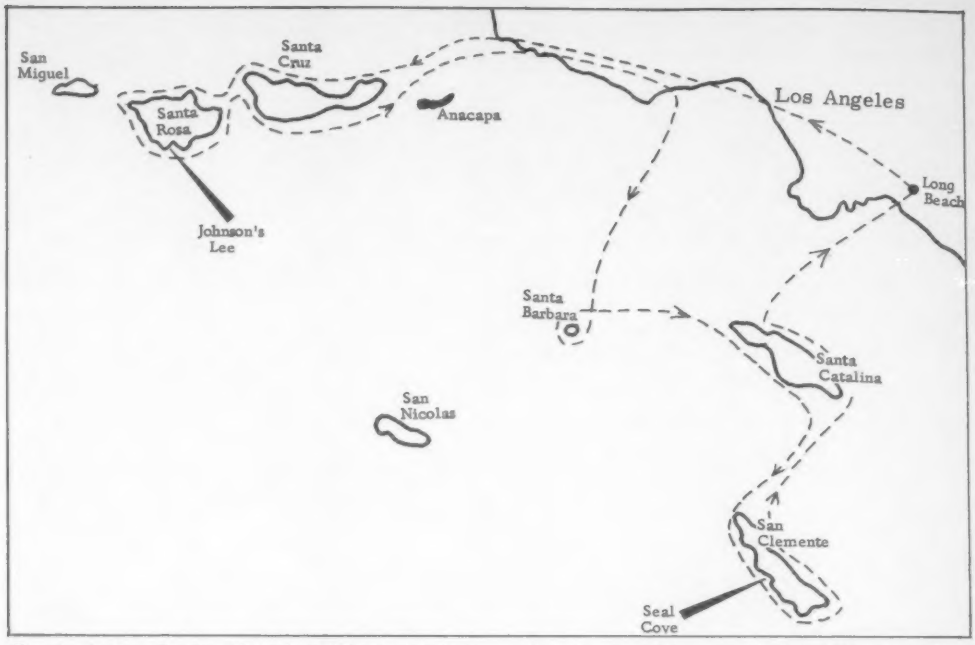


Fig. 1 - Airplane Spotting Flight 59-18 (October 23, 1959), to observe locations of commercial abalone diving activity.

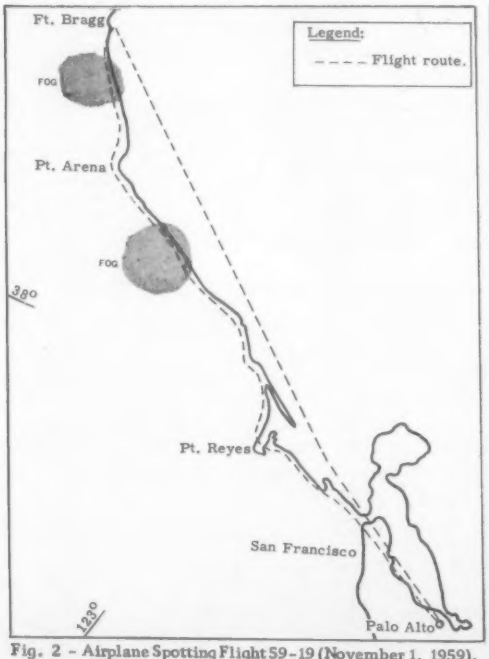
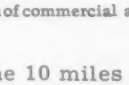


Fig. 2 - Airplane Spotting Flight 59-19 (November 1, 1959), to estimate numbers of abalone sport fishermen, clam diggers, and shoreside sport anglers.

other was the 10 miles of coast just north of Stewarts Pt. The Sunday afternoon flight was on a relatively warm day for the central California coast this time of year. There was a minus tide at sunset, the surf was definitely below average and the wind was light and variable; thus conditions were almost ideal for the sportsmen. This survey did not include Tomales Bay.



Cans--Shipments for Fishery Products, January-September 1959

Total shipments of metal cans for fishery products during January-September 1959 amounted to 93,049 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 94,284 tons in the same period of 1958. Fish

and shellfish canning activities in September 1959 were beginning to drop off seasonally from the high levels reached in July and August. Packs of salmon and Maine sardines were light in September and the pack of California sardines was way below predictions due to disputes over ex-vessel prices and scarcity of fish. Canned packs of tuna and shrimp in September of this year were good. Shipments of metal cans declined 0.3 percent from August to September 1959 and were down by 15.6 percent from September 1958 to September 1959.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

Central Pacific Fisheries Investigations

RESEARCH ON IDENTIFICATION OF TUNA LARVAE:

Several studies concerned with various aspects of the life history of the tunas, such as investigations of maturation and fecundity of adults, identification, distribution, abundance, and ecology of the larvae and juveniles, are being made by the U. S. Bureau of Commercial Fisheries' Honolulu Biological Laboratory. Since the studies require methods for sampling larvae and juveniles that will yield both qualitative and quantitative results, various types of nets (including small plankton nets and midwater trawls with a mouth-opening of 1,200 square feet) have been used. Exchange of larvae and juveniles with various research institutions in the Pacific have augmented the number of specimens available for study. In addition, the laboratory received, on a loan basis, the collection of young Scombroids made from the Danish research vessel Dana during several cruises to the Atlantic and around the world between 1911 and 1938.

On the basis of morphological features, positive identification has been made of the following tuna and tuna-like larvae: skipjack (Katsuwonus pelamis), yellowfin (Neothunnus macropterus), black skipjack (Euthynnus yaito, E. alletteratus), and the frigate mackerel (Auxis thazard). Yet to be identified are larvae of albacore (Thunnus germo), big-eyed (Parathunnus sibi), bluefin (Thunnus thynnus, T. orientalis, and T. maccoyi), and closely related forms such as the dogtooth tuna (Germo nuda).

In addition to studies of morphological features, other attempts at identification of larvae include the use of paper partition chromatography and serological techniques. It is possible to identify the adults of albacore, big-eyed, frigate mackerels (two species not distinguished), yellowfin, skipjack, and black skipjack through chromatography. However, this technique has technological limitations for use with larvae. Serological techniques, being conducted on Honolulu Biological Laboratory samples at the Seattle Biological Laboratory, await evaluation.

Better methods for capture of tuna larvae and juveniles are being developed. A high-speed sampler will be tested in the tropical waters of the Pacific during the spring of 1960. Nine out of 23 hauls with a midwater trawl yielded 39 juvenile tuna from those waters. Modifications of the trawl to increase its efficiency are being made. It will be used in an attempt to collect albacore tuna larvae next summer. A pumping system permitting continuous sampling from a vessel underway is also being considered. Installation of an aquarium system aboard the Bureau's research vessel Charles H. Gilbert, in which attempts will be made to fertilize tuna eggs and rear larvae and juveniles, is planned for the near future.

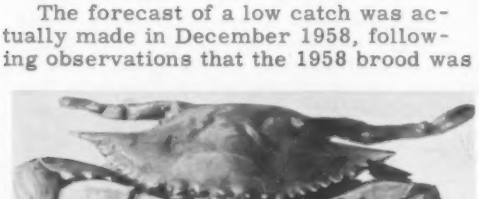
It is anticipated that studies utilizing specimens and samples presently available to Laboratory personnel, along with those from the future sampling programs, will result in: (1) identification of the important species of tuna and tuna-like larvae and juveniles; (2) increased knowledge concerning the life history of the tunas; and (3) a better understanding of the ecology, distribution, and abundance of the larvae and adults.

Crabs

CHESAPEAKE BAY BLUE CRABS SCARCE IN 1959/60 WINTER:

Beginning December 1, 1959, and for the following three months, over 150 Virginia vessels and motorboats, manned by more than 400 men, dredged for blue crabs in Chesapeake Bay. Dredgers were expected to be disappointed if they anticipated a large harvest for, according to marine biologists of the Virginia Fisheries Laboratory, blue crabs would probably be scarce and dredgeboat catches would be near the record low.

The forecast of a low catch was actually made in December 1958, following observations that the 1958 brood was



Blue Crab

very small. As additional evidence that the crop was small, the soft and peeler-crab catch at Tangier Island was about one-half normal size in the summer of 1959. Tangier Island usually produces about one-half of Virginia's soft crabs. Crabs reach commercial size a year after hatching, and are usually at least 18 months old when caught by the winter dredges. Since 1950, catches have been above average in 5 winters and below average in 4. After this winter the score will be even.

Crab dredgers have been disappointed with their catches the last three winters. Last year the hibernating crabs bedded down among millions of blue mussels which promptly attached themselves to the crabs, often 200 or more mussels per crab. Thousands of blue mussels were brought up by each dredge haul, and extra deck hands were hired to clean the crabs before they could be landed. Normally, the mussels set in the spring grow to about one inch and then die during the heat of late summer. But in 1958, it is believed that the mussels survived because of the coolness of the summer. Most of the dredgers had never encountered as many mussels in previous years.

During a survey of the crab-dredging grounds in October 1959 from aboard the Laboratory's research vessel Pathfinder, the biologists found many dead mussels and only a few live ones, indicating that last year's problem will probably not be encountered this winter.

A bright ray of hope for the future for the blue crab industry was seen in October 1959 in a big crop of fingernail-size crabs, caught during one of the regular monthly surveys by Laboratory scientists. These crabs, hatched in mid-summer, will produce a better-than-average catch the winter of 1960/61.

Croakers

BIOLOGISTS SURVEY CHESAPEAKE BAY FOR 1959 YEAR-CLASS:

Fishery biologists from the Virginia Fisheries Laboratory aboard the research vessel Pathfinder, ranged over 1,000 miles of Chesapeake Bay and its tributaries during mid-November in search of the 1959 brood of croakers. They covered both Virginia and Maryland waters and were assisted by biologists from Maryland's Chesapeake Bay Laboratory. The purpose was to measure the success of the 1959 spawning of croakers which began in the fall of that year. "For the past two winters we have found young croakers in the rivers during the late fall but later on they were killed off, apparently by the unusually severe cold which persisted for several days keeping temperatures below freezing," the Virginia biologist in charge of the survey reported.

Croakers are known to spawn in the ocean outside of the Capes and the young come into Chesapeake Bay in fall and winter and move up into fresh water where they spend the first few months of their lives. When Virginia's scientists

surveyed the entire Bay in the spring of 1959 they located no young croakers anywhere. Although the Bay produced some fish of large size, 1959 croaker fishing was very poor, as had been predicted by the Laboratory's biologists. For instance, sport fishermen had to spend eight hours fishing during the summer of 1959 to catch as many croakers as they had landed in one hour in previous seasons and the commercial catch was generally low.

"The future of the croaker fishery depends on successful spawning in the ocean and survival of young fish that migrate into the Bay," the biologist emphasized. Although croakers leaving the Bay in fall are full of eggs, it is known that they do not deposit them until they reach ocean waters. In December 1959 explorations were started in the Atlantic in an attempt to locate areas where eggs are laid and where larval croakers may be found. One of the objectives of these research programs is to explain why the numbers of croakers available to fishermen varies so widely over the years. Work already completed indicates that all croakers caught by commercial and sport fishermen together has little effect on depleting numbers present in the Bay. Apparently the change in numbers is chiefly influenced by natural causes, but more work is necessary before we can know what factors affect croaker populations the most.

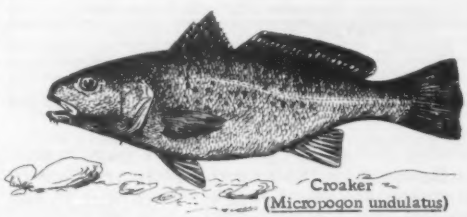
Virginia Fisheries Laboratory's research vessel Pathfinder.

On the 1959/60 surveys, biologists from Virginia's marine laboratory will carry on a cooperative study of menhaden spawning with the U. S. Bureau of Commercial Fisheries, and will also release numerous drift bottles for studying ocean currents in conjunction with the Woods Hole Institution of Oceanography. Although this last phase of the program is intended primarily for oceanographers, the information obtained about ocean currents will also be helpful in clarifying puzzling questions about the movements of very young fishes. Drift bottle current studies will also yield more detailed knowledge about the movements of inshore currents which is necessary in dealing with the problems of the disposal of radioactive wastes and other pollutants in the sea.

* * * * *

VIRGINIA BIOLOGISTS SEEK BREEDING AREAS IN ATLANTIC:

A search for croaker breeding grounds was made December 7-10, 1959, by the research vessel Pathfinder of the Virginia Fisheries Laboratory. Areas in the lower part of Chesapeake Bay and the Atlantic Ocean were surveyed. A total of 30 stations was occupied in areas extending 60 miles along the Atlantic coast south of Cape Henry, Va., and 50 miles out to sea. The ship hove-to at designated stations every 10 miles to take water samples, record water temperatures, and to release drift bottles for ocean current studies. Plankton tows were made with large plankton nets and a specially-designed deep-water sampler.



Croaker (Micropogon undulatus)

"Most of the work was done at night," the chief biologist reported, "because the chances of larval fish being near the surface are greater at that time." Bottom plankton samples were collected with a Gulf III plankton-sampler (developed by the Galveston Biological Laboratory of the U. S. Bureau of Commercial

Fisheries), a medium-speed sampler used for towing near the bottom.

This is the first exploration made specifically to locate areas where the croaker spawns and larval croakers develop. The biologists anticipate making trips every month during 1960 to establish the time and place of spawning not only for croaker, but also for menhaden, spot, grey sea trout, and other fish.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-NOVEMBER 1959:

Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.4 million pounds (value $0.7 million) of fresh and

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, November 1959 with Comparisons

QUANTITY				VALUE			
November		Jan.-Nov.		November		Jan.-Nov.	
1959	1958	1959	1958	1959	1958	1959	1958
(1,000 Lbs.)				($1,000)			
1,443	1,499	20,876	20,881	713	908	10,748	11,967

frozen fishery products were purchased in November 1959 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in October by 25.8 percent and 3.7 percent under the amount purchased in November 1958. The value of the purchases in November 1959 was lower by 32.9 percent as compared with October and 21.5 percent less than for November 1958.

During the first eleven months of 1959 purchases totaled 20.9 million pounds (valued at $10.7 million)--about the same in quantity, but lower by 10.2 percent in value as compared with the similar period in 1958.

Prices paid for fresh and frozen fishery products by the Department of Defense in November 1959 averaged 49.4 cents a pound, about 5.2 cents less than the 54.6 cents paid in October and 11.2 cents less than the 60.6 cents paid during November 1958.

Canned Fishery Products: Salmon was the principal canned fishery product purchased for the use of the Armed Forces during November 1959. In the first eleven months of 1959, the purchases of canned tuna were down 40.5 percent, canned salmon lower by 67.5 percent, and canned sardines were up about eight-

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, November 1959 with Comparisons

Product	QUANTITY				VALUE			
	November		Jan.-Nov.		November		Jan.-Nov.	
	1959	1958	1959	1958	1959	1958	1959	1958
	(1,000 Lbs.)				($1,000)			
Tuna	355	1,035	2,957	4,966	154	542	1,357	1/
Salmon	414	553	1,085	3,336	267	341	737	1/
Sardine	1	18	1,026	111	1	6	166	1/

1/Unavailable.

fold as compared with the same period in 1958.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

Great Lakes Fisheries Exploration and Gear Research

WESTERN LAKE ERIE SURVEYED FOR COMMERCIAL FISH STOCKS:

M/V "Active" Cruises 7 and 8: Exploratory fishing for commercial fish stocks in west central and western Lake Erie (between Fairport and Port Clinton, Ohio), was continued by the U. S. Bureau of Commercial Fisheries chartered fishing vessel Active between October 20 and November 23, 1959. Cruises 7 and 8 were planned to obtain additional information on the availability of smelt and other fish stocks to commercial fishermen.

Fishing operations during both cruises were hampered by high winds, rough seas, and hazardous ice formations. Fish concentrations were found to be widely scattered over the entire area and no commercial scale catches were taken.

A total of 31 trawl tows were completed in the 2-12 fathom depth range with a 50-foot, 2-seam balloon trawl net with 1½-inch and 2¼-inch mesh cod ends. Individual trawl catches, which did not exceed 100 pounds per tow, were composed of mostly yellow perch and emerald shiners with smaller amounts of smelt, white bass, gizzard shad, alewife, whitefish, carp, and catfish. One seine set was made in Fairport Harbor on sizable echo-sounder indications with a 300-foot by 10-foot beach seine. All but a few pounds of emerald shiners escaped through the seine's one-inch mesh.

Surface water temperatures recorded during the cruises ranged from 59° F. in late October to 36° F.

at the termination of cruise 8. Bottom temperatures recorded were found to vary little from the surface temperatures indicating that thermal stratification of the lake waters had disappeared prior to cruise 7.

Cruise 7 was interrupted on October 25 at Vermilion, Ohio, for the purpose of demonstration of trawl gear to observers representing the Ohio Commercial Fishermen's Association and Ohio Sportsmen's and Conservation organizations.

Cruise 8 was the last exploratory fishing and gear research cruise scheduled for calendar year 1959. The M/V Active returned to Port Clinton, Ohio, November 23 for winter storage.

Great Lakes Fishery Investigations

WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 9: Abundance and distribution of spawning whitefish and the physical characteristics of whitefish spawning grounds were studied by U. S. Bureau of Commercial Fisheries personnel aboard the research vessel Siscowet during November 9-21, 1959. Gangs of approximately 3,000 feet of large-mesh nets (5- to 6-inch mesh, stretched measure) and 300 feet of small-mesh nets ($1\frac{1}{2}$- and $2\frac{1}{2}$-inch mesh) were set over spawning grounds. Through the guidance of commercial fishermen in the area, the following grounds were selected: Outer Island Shoals (west side), Cat Island Shoal, Big Bay on Madeline Island, Presque Isle Bay on Stockton Island, and Rocky Island Shoal. The bottoms of the various grounds were: Outer Island Shoals, small boulders and sand; Cat Island Shoal, broken bed-rock; Big Bay, smooth bed-rock; Presque Isle Bay, small boulders and sand; Rocky Island Shoal, large boulders.

The catch of spawning whitefish was meager at all locations. The largest catch was 19 whitefish (16 males, 3 females) on Rocky Island Shoal in water $3\frac{1}{2}$ to 9 fathoms deep. Two large-mesh nets floated about 1 foot below the surface in water $3\frac{1}{2}$ fathoms deep took no fish. Whitefish taken at other locations were as follows: Outer Island Shoals ($3\frac{1}{2}$-7 fathoms), 2; Cat Island Shoal ($3\frac{1}{2}$-8 fathoms), 5; Presque Isle Bay (5-13 fathoms), no catch; Big Bay (4-7 fathoms), 5. All of the whitefish were ripe males except 1 ripe female taken at Big Bay. Twenty-one of the fish were tagged and released at the point of capture.

The whitefish taken on the spawning grounds were relatively small. They varied from 17.3 to 23.7 inches long and averaged 19.8 inches.

Lake herring and menominee whitefish dominated the catch in the small-mesh nets at each location. Lesser catches were made of longnose suckers and burbot. The average weight of the 195 lake herring taken in the $2\frac{1}{2}$-inch mesh nets was 0.7 pound. All of the mature lake herring and menominee whitefish were ripe and appeared to be in spawning condition.

A short gang of chub nets ($2\frac{1}{2}$-inch mesh) was set in 45 fathoms between Madeline and Stockton Islands to investigate the spawning of chubs (Leucichthys sp.). Only 14 chubs were captured (12 L. hoyi, 2 L. zenithicus. One L. hoyi was spent and 11 were nearly ripe. The L. zenithicus were not ripe. Almost all of 78 lake herring in this lift were nearly ripe.

Bathythermograph casts showed water to be homothermous down to 45 fathoms. Surface temperatures varied from 37.4° F. at Big Bay to 41.8° F. at Outer Island Shoals.

Cruise 10: This cruise (November 23-December 26, 1969) explored the distribution of the lake herring during the spawning season and collected eggs from certain species of chubs (Leucichthys sp.). Gill nets were fished south of Stockton Island, and trawl tows were made south of Stockton Island and in Pike's Bay. A recording echo-sounder was operated over large areas among the Apostle Islands to learn more of the areal and vertical distribution of the lake herring at different periods of the day and night.

Concentrations of fish were recorded by the sounder in nearly all areas visited among the islands. The heaviest concentrations appeared at about 15 fathoms in water 25 to 50 fathoms deep. Vertical distribution was practically the same day and night. During the night some of the fish seemed to move along the 15-fathom level from deeper waters to inshore areas where they appeared just above bottom. It was assumed that fish that made traces on the sounder chart were lake herring as commercial nets were taking up to 3 tons per lift. Trawl tows by the Siscowet failed, however, to take lake herring in these areas.

Four night-time trawl tows were made south of Stockton Island at depths ranging from 7 to 45 fathoms. The sounder recorded fish concentrated on or near the bottom only at depths of 15 fathoms or less in this area. Tows made at 7 to 21 fathoms caught predominately smelt, trout-perch, and slimy muddlers. Twenty-eight whitefish (6 to 19 inches) and 7 lake trout (6 to 15 inches) were taken in three 12-minute tows. No lake herring were captured.

A 12-minute trawl tow made at 45 fathoms took 82 L. hoyi and lesser numbers of slimy muddlers, spoonhead muddlers, and ninespine sticklebacks. One lake herring was captured in this tow. The sounder recorded no concentration of fish on or near the bottom at this depth.

Two night-time trawls tows made in Pike's Bay at depths of 18 to 20 fathoms. The sounder recorded heavy concentrations of fish just off the bottom but they could not be positively identified as lake herring. The catch from two 12-minute tows consisted mainly of smelt and slimy muddlers. Four lake herring, 2 lake trout, 1 whitefish, and 1 L. hoyi were also taken.

Gangs of gill nets ($2\frac{1}{4}$- and $2\frac{1}{2}$-inch mesh) were set south of Stockton Island at 51 to 53 fathoms to capture spawning chubs (Leucichthys sp.). A set made on November 23 captured 161 L. hoyi, 4 L. kiyi, 20 L. zenithicus, 611 lake herring, and 48 burbot. Eggs were collected and fertilized from all ripe L. hoyi and L. kiyi. About 75 percent of the L.

hoyi were green, 15 percent ripe, and 10 percent spent. Fifty percent of the L. kiyi were ripe and 50 percent green. All of the L. zenithicus were green and all of the lake herring were ripe. A set over the same grounds on December 2 captured 243 L. hoyi, 4 L. zenithicus, 272 lake herring, and and 8 burbot. At least 95 percent of the L. hoyi were green and only 8 individuals were spent. All of the L. zenithicus were green and all lake herring were ripe or spent.

Chub eggs were taken to the Wisconsin Conservation Department fish hatchery at Bayfield where they will be held to the eyed stage. At that time they will be transferred to the hatchery at Northville, Mich., for hatching and study.

Bathythermograph casts showed homothermous conditions down to 53 fathoms. Surface temperatures ranged from 35.5° F. at Pike's Bay to 37.8° F. south of Stockton Island.

Note: Also see Commercial Fisheries Review, January 1960 p. 38.

Gulf Fishery Investigations

Following are some of the highlights of the studies conducted by the Galveston, Tex., Biological Laboratory of the U. S. Bureau of Commercial Fisheries during October-December 1959.

MIGRATIONS OF SHRIMP: As of the fourth quarter of 1959, 27 of 7,084 pink shrimp stained and released in Barnes Sound, Fla., in early July 1959, were recovered. All were recaptured in Barnes Sound, excepting one caught at the entrance to Little Card Sound, immediately north of Barnes Sound. Results of this experiment suggest that the range of some pink shrimp populations is quite restricted.

Preliminary analysis of growth rates of Barnes Sound recoveries (predominately females) indicates an increase in mean carapace length of approximately 3.0 mm. a month. Mean carapace length at release was 19.5 mm. This represents a weight increase of from 115 to 87 count, heads off, during the first month after release.

During November 2-6, a total of 16,638 pink shrimp were stained with fast green and released in the Shark River area of Everglades National Park. The purpose of this experiment was to determine if pink shrimp nurtured in that locality contribute to the Tortugas fishery, to the Sanibel fishery, or perhaps to both. As of the end of 1959, four marked specimens were recovered by commercial shrimp vessels on the Tortugas grounds, the first of these was taken 35 days after being released. None were reported taken on the Sanibel grounds.

As the fourth quarter of 1959 closed, staining equipment was being transported to Bahia Honda Key for a shrimp marking operation to be conducted in Hawk Channel in the Atlantic southwest of Marathon. The purpose is to determine whether or not pink shrimp migrate from the Atlantic Ocean to the Tortugas grounds.

Typical poster distributed in shrimp ports in Gulf States to encourage the return of stained shrimp by fishermen, dealers, and processors.

Several collections of gravid female shrimp were made in support of the project concerned with identification of larvae. Ripe females brought to the laboratory were placed in containers and observed in hopes they would spawn viable eggs. On October 7, a single female seabob (Xiphopeneus krøyeri) was caught in a trawl haul at one of the Gulf sampling stations and returned to the laboratory where she spawned. Overnight trips to offshore spawning grounds (15-25 fathoms) southeast of Galveston were made on October 22, and November 19. Over 100 ripe brown shrimp (Penaeus aztecus) were collected each trip and brought back to the laboratory where several spawned. Plankton samples taken on the spawning grounds were found to contain penaeid nauplii and later stages. These should aid in assembling a complete series of larval instars.

SHRIMP LARVAL STUDIES: In addition to maintaining a small number of miscellaneous shrimp species (Eusicyonia sp., Xiphopeneus krøyeri, Trachypeneus sp., and Hippolytidae, species unknown), three of commercial importance, Penaeus aztecus, P. duorarum, and P. setiferus, have been maintained in substantial numbers in the laboratory under conditions of varying diet, tempera-

ture, and lighting for a period of more than six months. Although molts have occurred at regular intervals and examination of casts of recently molted shrimp have revealed that copulation did occur on several occasions among individuals held in the aquaria, we have had no success inducing these shrimp to attain a spawning condition. In fact, it has been noted that shrimp brought into the laboratory with partially mature gonads actually have them regress after remaining in the laboratory for as long as a month. Only those shrimp possessing mature gonads at the time of capture have spawned in the laboratory, usually very shortly after arrival. It was from such individuals that early larval stages of two species of shrimp were obtained.

Because of the lack of success in obtaining spawn from shrimp maintained under artificial conditions for long periods of time, the number being kept in the laboratory has been reduced somewhat. Efforts are now being directed toward securing females most likely to spawn immediately after being deposited in laboratory tanks.

On October 7, one ripe female seabob, Xiphopeneus krøyeri, was taken during a regular offshore plankton collecting trip. Held in a fifteen-gallon plastic aquarium, it spawned the following day. The eggs, only slightly heavier than sea water, were carefully siphoned from the bottom of the aquarium and transferred to two four-liter beakers for closer observation. Continuous observations were recorded as the eggs hatched and the larvae developed through five naupliar instars into the first protozoea.

On October 24, the day following their capture, several gravid brown shrimp, P. aztecus, spawned in the laboratory. Two days later one female taken during the same collecting trip was observed while in the act of spawning. Unfortunately, high microorganism densities proved detrimental to the developing eggs and larvae; consequently, only a few individuals reached the first protozoeal stage. As in the October Xiphopeneus spawn, a continuing record was kept and specimens of each larval stage were preserved.

Gravid brown shrimp were again brought into the laboratory on November 20. Spawning began the following day and continued over the next three days, resulting in a large number of eggs being obtained. Several instances of abortion were noted during this period. By carefully planning and making adequate preparation beforehand, much of the contamination experienced during previous spawns was avoided. As a consequence, a large number of eggs hatched and hence a larger number of nauplii were carried through to the first protozoeal stage. Specimens of each developmental stage were again preserved and all observations and other pertinent data recorded to provide for later description of the species during the stages observed.

Preliminary work toward a detailed description of successive developmental stages in the life history of P. aztecus has begun. Accurate drawings and tracings are being made with the aid of camera lucida, stained mounts, and photo-micrographs which were taken of both living and preserved organisms. Staining, clearing, and mounting techniques have been satisfactorily worked out and a number of specimens have been permanently mounted for ease and convenience of study, and for future reference. Comparative study of early stages of species made available thus far will begin shortly.

BAIT SHRIMP PRODUCTION, GALVESTON BAY: The statistical canvass of bait-shrimp dealers and suppliers in the Galveston Bay area continued on a routine basis. Estimates of total production (volume consumed) and gear effort expenditure indicate vigorous growth of the local bait-shrimp industry. Whereas, approximately 676,000 pounds were handled during the two-year period ending May 30, 1959, about 419,000 pounds were landed and sold commercially during July through November 1959. Brown and white shrimp were by far the dominant species taken, the latter being the more important on a year-round basis.

INDUSTRIAL FISHERY STUDIES: Age determinations of menhaden by scale analyses were completed for the 1958 menhaden samples collected at Moss Point, Miss. One-year-old fish comprise 54.8 percent of the specimens, compared to 23.3 percent for this age group in 1957. Two-year olds declined from 66.8 percent in 1957 to 20.5 percent possibly reflecting the small percentage of one-year olds in 1957. The percentage of three-year olds increased from 9.0 percent in 1957 to 19.4 percent which might be expected from the very high percentage of two-year-old fish in 1957. Young of the year (zero's) increased from 0.3 percent to 2.8 percent. Most of these fish were taken in late summer. The remaining 2.4 percent were made up of 4- and 5-year olds.

During October 1959, croaker (Micropogon undulatus) contributed approximately 40 percent by weight to the industrial fish catches sampled, spot (Leiostomus xanthurus) 10 percent, and white trout (Cynoscion nothus) 14 percent. These three species made up roughly 64 percent of the catches sampled during that month. The remaining 36 percent was made up of numerous other species in varying amounts.

During November croaker roughly contributed 60 percent of the weight of the catches sampled; spot, 6 percent; and white trout, 7 percent. Combined, these three species made up 72 percent of the total weight of the catches sampled. The species list now includes 63 families and 141 species.

The industrial fish catches sampled during October and November were taken in waters between Gulf Shores, Ala., to the east and Timbalier Bay, La., on the west. Ninety-seven percent of all catches sampled were made between Gulf Shores and the mouth of the Mississippi River, and 67 percent of the catch was made between the mouth of Mobile Bay and a line running from Horn Island down the eastern shore of Chandeleur Island to the mouth of the Mississippi River. Most fish were caught in waters of 3 to 7 fathoms during October and November with the peak at 4 fathoms.

Studies of the life histories of several important species contributing to this fishery have been limited to a weekly catch sample for length, weight, and spawning condition studies. Personnel assigned to this project have been occupied with sampling for species composition, gathering catch statistics, and working up the data to a form usable for publication.

The study of the demersal fish utilized for industrial products such as pet food, mink food, and fish meal for animal foods is being carried on in much the same manner as described in previous reports this year, except that starting December 1, 1959, sampling intensity was reduced.

Sampling as of that date was reduced to two days a week to prepare past data for publication and to allow more time for other phases of the study. As many vessels as possible are sampled during the two days each week. In order to minimize any bias due to the days of the week sampled, it is tentatively planned to advance the sampling time to two calendar days each week. For instance, it will be done on Monday and Tuesday this week, Wednesday and Thursday next week, and Thursday and Friday the third week. The cycle will start over again the fourth week. In case no vessels land on the days scheduled, the following day's landings will be sampled.

During October 68 vessels were sampled. Their total catch was 1,874,213 pounds. The average weight per catch was 27,562 pounds. During November, 53 landings were sampled. They had a combined weight of 960,101 pounds. The average catch was 18,115 pounds. This made a total for the two months of 121 vessels sampled, a total of 2,834,314 pounds of fish, and an average catch of 23,424 pounds per vessel.

Note: See Commercial Fisheries Review, March 1959 p. 38.

Maine Sardines

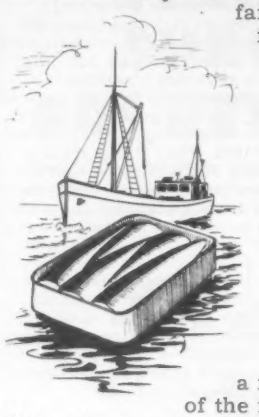
CANNING SEASON FOR 1959 CLOSES WITH A SHORT PACK:

The Maine sardine packing season officially closed at midnight December 1, 1959, with a total canned pack of approximately 1,750,000 cases (100 3¾-oz. cans), which was far short of the industry's preseason goal of 2,100,000 cases.

The subnormal pack will result in a complete sellout of stocks by all canners before the 1960 season gets underway next June with shortages of many types and varieties occurring by midwinter, the Maine Sardine Council predicts.

The comparatively small carryover from the 1958 pack would not make up the deficit in the disappointing pack in 1959.

The short pack was due to an uncertain, spotty, and thoroughly unsatisfactory fish supply. The small-size herring were late in arriving on the coast and there was limited production in June, which is normally one of the best months of the year. From then on, it was a case of continuous uncertainty which was topped off by failure of the usual fall run of highly desirable canning fish to materialize. Many plants closed in mid-October and those that kept open through November enjoyed only sporadic operations.



The "western" and "eastern" areas produced a major percentage of the fish while the traditionally steady supply in the middle area from Milbridge to Rockland failed for the first time in years. The situation was not an abnormal one for the 1950's as shortages also occurred in 1951 and 1955. Scientists blame poor spawning and survival conditions rather than any major or permanent dislocation of the fish supply.

The market for Maine sardines is normal with prices firm, and is expected to continue so for an indefinite period.

A total of 35 plants operated for varying lengths of time during the season with but few of them getting the sizable pack necessary for efficient operations. Generally speaking it was also a poor year for the sardine fishermen.

* * * * *

CANNED STOCKS, NOVEMBER 1, 1959:

Distributors' stocks of Maine sardines totaled 296,000 actual cases on November 1, 1959--16,000 cases or 5.1 percent less than the 312,000 cases on hand November 1, 1958. Stocks held by distributors on July 1, 1959, amounted to 176,000 cases, and on April 1, 1959, totaled 254,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on November 1, 1959, totaled 1,001,000 standard cases (100 3¾-oz. cans), a decrease of 36,000 cases (3.5 percent) as compared with November 1, 1958.

Table 1 - Canned Maine Sardines--Wholesale Distributor's and Canners' Stocks, November 1959 with Comparisons[1/]

Type	Unit	1959/60	1958/59				
		11/1/59	11/1/58	1/1/59	4/1/59	6/1/59	7/1/59
Distributors	1,000 Actual Cases	296	312	268	254	197	176
Canners	1,000 Standard Cases[2/]	1,001	1,037	891	474	272	422

1/Based on marketing season from November 1-October 31.
2/100 3¾-oz. cans equal one standard case.

The 1959 pack (from the season which opened on April 15, 1959, and ended on December 1, 1959) amounted to about 1,750,000 standard cases as compared with 2,100,000 cases packed in the 1958 season. The pack for the 1957 season totaled 2,117,151 standard cases.

The total supply (pack plus carry-over on April 15, 1959) at the canners' level as of November 1, 1959, amounted to 2,121,000 standard cases or 6.3 percent under the total supply of 2,263,000 cases as of November 1, 1958. Canners' shipments from April 15, 1959, to November 1, 1959, amounted to 1,120,000 cases as compared with 1,226,000 cases during the April 15-November 1, 1958, period.

Maryland

CONTROLLABLE PITCH PROPELLER ON HYDRAULIC DREDGE VESSELS MAY REDUCE SOFT-CLAM HARVESTING COSTS:

A Maryland State shellfish biologist cooperating with a private shipyard on December 18, 1959, disclosed an equipment improvement which promises to reduce soft-clam harvesting costs by 20 percent.

The shellfish biologist of Maryland's Chesapeake Biological Laboratory has tested satisfactorily a controllable-pitch propeller which cuts power needs of a typical clam rig in half. He proposed the development of this new powering system to a number of propeller manufacturers and a Connecticut shipyard engineered the final product, which is now being field-tested. If further tests confirm the excellent results from preliminary tests, the propeller will be on the market in the spring of 1960.

The new propeller eliminates one of the two large power plants presently required on most of Maryland's soft-clam vessels. One of the engines propels the vessel while the other drives a powerful water pump which literally blows clams out of the bottom mud in the Chesapeake Bay.

The pump engine must work at high speed to develop the necessary water pressure, but the boat itself should move very slowly. The biologist combined the two requirements by using one engine to serve both purposes; the "flattened" blades of the propeller bite only small slices of water on each turn, even with the engine running fast enough to drive the water pump. When clam harvesting operations are finished, the clammer disengages the water pump, adjusts the propeller bite to a sharp angle, and heads home at a normal cruising speed.

Besides eliminating an engine (usually 80-120 hp.) and its initial high cost, the propeller will cut gasoline consumption by about 20 percent, the biologist believes. The deadweight of the boat will also be reduced, storage space will be gained, and engine maintenance costs should be lower.

The design was made purposely simple enough to withstand long-term high-load clam harvesting operations, the biologist said. It has been tested aboard the Laboratory's research vessel John A. Ryder.

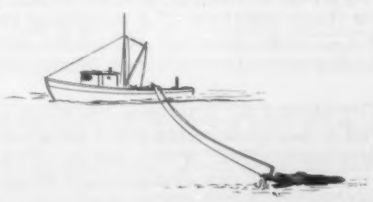
In 1959, the number of licensed clam boats in Maryland was 224. The year's harvest will be about 300,000 bushels, worth $1.2 million, or more than the rest of the Nation's combined output of soft clams.

The Director of the laboratory states that while their research doesn't ordinarily extend to design and development of commercial harvesting gear, their extensive studies of clams and the new clam dredge have made them unusually aware of the young industry's problems.

* * * * *

LITTLE FALLS FISHWAY NEARS COMPLETION:

After many years of effort by the U. S. Fish and Wildlife Service and the Maryland fishery agencies, the proposed fishway at the new Corps of Engineers dam at Little Falls on the Potomac River near Brookmont, Md., is rapidly becoming a reality. It was over 80 percent complete in October 1959, and is expected to be ready for operation in the spring of 1960.



North Atlantic Fisheries Exploration and Gear Research

SURVEY OF DEEP-WATER WHITING ABUNDANCE IN WINTER OFF NEW ENGLAND:

M/V Delaware Cruise 60-1: To determine the abundance of whiting (Merluccius sp.) in deep water during the winter months was the purpose of a January 5-31, 1960, scheduled cruise to the Georges Bank area and the continental shelf south of Block Island of the U. S. Bureau of Commercial Fisheries' exploratory fishing vessel Delaware.

Fishing tests along the Continental Shelf south of Block Island were to be made with both bottom and midwater trawls.

Oceanography

WOODS HOLE OCEANOGRAPHIC INSTITUTION RECEIVES GRANT FOR RESEARCH VESSEL:

A $3 million grant from the National Science Foundation for the design and construction of a new oceanographic research vessel was announced November 25, 1959, by the Woods Hole Oceanographic Institution, a private nonprofit research organization. This is the largest gift or grant the Institution has received in its 29 years of existence.

In 1930, the Rockefeller Foundation and the Carnegie Corporation provided about $2 million to the Institution to erect its first laboratory, to design and build a research vessel, and to employ a small professional staff. Since that time other grants have made it possible for the Institution to increase its scientific staff to about 135 investigators and a total staff of nearly 400. The Institution's fleet consists of 5 seagoing vessels and three aircraft, while its shore facilities include two large laboratories.

The Board of Trustees recently adopted a major development program for the Institution, which hopes to raise $38 million for the Endowment Fund, to increase its staff, provide more fellowships, endow four Chairs in oceanography, build a third laboratory, and renovate its fleet.

The Institution designed and built the research vessel Atlantis in 1931. Today that famous vessel still is the only United States deep-sea vessel especially designed for oceanographic work. The vessel has sailed some 1.5 million miles in all oceans and is out to sea some 250 days each year. Apart from the fact that the ship is old and may soon have to be laid up, the Atlantis has grown too small. One of the difficulties in oceanography has been that students do not have the opportunity to go to sea. The new vessel will have accommodations for 19 scientists as opposed to 9 on board the Atlantis and most of the Institution's other ships. It is expected that a number of students will be taken aboard the new vessel.

In addition to the Atlantis, the Institution has had the use of other ships--yachts, fishing boats, naval vessels, etc. Most of these vessels were acquired to fill an immediate need and were adapted to do the job as well as possible. Such conversions are costly to accomplish and to operate and less efficient than specially designed ships.

The selection of the new vessel has resulted from a close examination of the needs of modern oceanography. A committee has worked hard to develop a ship, 175 feet long, that would incorporate the unique qualities and features necessary for the Institution's work.

For instance, it is planned to control the rolling of the ship with tanks whose liquid contents are synchronized to the rolling period of the ship. A center well in the hull will make it possible to lower instruments from below decks, while a bow propulsion unit will enable precise maneuvering of the ship. An underwater observation chamber will be placed in the bulbous bow and the ship will be able to creep along at very slow speeds when desired. She will have a range of 7,000 miles at 12 knots. Also, the ship is to be as quiet as possible in machinery and propulsion so as to have as little ship

noise as possible while making underwater sound studies. About ten winches are planned--some will be used to lower equipment for shallow depths while others will be capable of reaching to the ocean bottom. The new ship will have high standards of living quarters.

The new vessel will be the best equipped research ship afloat and is expected to be the most modern in design. Her superior facilities will enable her to carry out the increasingly complex phases of modern oceanographic field work.

Oregon

USE OF MONOFILAMENT IN SALMON GILL NETS PROHIBITED:

On December 8, 1959, the Oregon Fish Commission voted to prohibit the use of monofilament gill-net mesh in Oregon. This action will tie in with the state of Washington's present ban on monofilament nets.

Monofilament, in use for sportfishing lines for several years, has only recently been woven into gill nets. It is more effective than conventional linen or nylon nets because it is practically invisible in water and permits effective use in daylight hours.

Oregon and Washington fishery biologists stated that use of the nets possibly could increase catches and necessitate other restrictions on the already severely restricted Columbia River gill-net fishery for salmon.

Oysters

OBSERVATIONS ON CONDITION OF MARYLAND'S GROUNDS:

A three-agency biological check of Chesapeake Bay's public oyster bars yielded some good news and some bad, Maryland's Chesapeake Biological Laboratory reported on December 18, 1959.

The Laboratory, the Maryland Tidewater Fisheries Commission, and the U. S. Bureau of Commercial Fisheries cooperated in checking representative productive oyster bars from upper Chesapeake Bay to the Virginia line. The senior shellfish biologist of the Laboratory reported the following:

Favorable Observations: The Bay's oysters are healthy. Those above the Chesapeake Bay Bridge are especially fat and have grown rapidly because rains during the summer of 1959 held off and allowed the upper Bay to become saltier than usual. Upper Bay oysters thrive and fatten in such conditions. In addition, no sign was seen of the heavy oyster mortalities such as have recently plagued nearby states. Scientists noted the best set of baby oysters in Tangier Sound since 1945.

Unfavorable Observations: The set of oyster spat above the Chesapeake Bay Bridge was again very poor. The shellfish biologist states "The last good set there was in 1955 and that is what they are working on now. The Western Shore north of Cove Point showed near zero set for its sixteenth consecutive year."

"The adult oyster population, therefore, is decreasing steadily in these regions, as it is in many other Maryland areas."

The survey was made aboard the Commission's survey vessel, Maryland. Samples were taken by dredge from oyster bars in the Bay, the Choptank River, Potomac River, and parts of Tangier Sound.

Data collected from 121 locations showed the pattern of the 1959 oyster set typical of recent years. Very few bars had enough young oysters to provide useful seed. Many beds have a low rate of replacement, and most of the bottom area which produced oysters 50 years ago has no young oysters.

It was noted that while Maryland benefited in the upper reaches of Chesapeake Bay because of the dry spring and summer, Virginia's oyster crop suffered up to 50 percent mortality from a fungus which prefers unusually high salinities. In addition, the biologist stated, Virginia benefits from a rainy summer, when the upper bay generally has poorer oysters.

The scientist emphasized that the late fall 1959 survey was of broad open waters only; surveys in the spring of 1959 of tonging bars in tributaries revealed good sets of Bay oysters in several areas. The survey was the twentieth annual look at the oyster beds wherein Maryland research and management agencies cooperated.

* * * * *

OBSERVATIONS ON OYSTER SET IN MARYLAND WATERS, SUMMER-FALL 1959:

Except for Smith Creek, the summer and fall 1959 oyster-spat setting on test shells planted in Maryland's Chesapeake Bay waters was a little better than the 1958 set, but with no periods of heavy setting such as sometimes occur. Survival and growth of oysters were good in most areas. No evidence of unusual mortality was found except for an accumulation of oyster shells on Cinder Hill in Holland Straits. Many of these shells can be accounted for as a result of oxygen-depleted water invading the area in late 1958 when a fish kill and kill of crabs in pots also occurred. Oysters were fair to fat in the upper half of the Bay but generally poor elsewhere at the time of the survey. By mid-October the Chesapeake Biological Laboratory, Solomons, Md., stopped observing the set on test shells as there was little likelihood of any further set beyond that period since water temperatures in mid-October fell rapidly to levels at which oysters do not spawn.

The primary purpose of test-shell exposure is to determine the time and relative intensity of oyster setting on similar clean shell surfaces at a given location. The amount and type of fouling at different seasons also are shown. Counts of spat on test shells do not represent the commercial set present at the end of the season because many of the newly-attached spat are smothered or otherwise destroyed.

A marked spell of lower temperatures in mid-June 1959, following abnormally high temperatures in late May and early June, is believed to have caused a loss of early larvae and a delay in the start of the first wave of general setting. A period of exceptionally heavy rains in July may also have accounted for the dispersal and loss of larvae at that time. Fouling by barnacles and Bryozoa generally was light except

for a July barnacle set in Hooper Straits and the beginning of a heavy fall barnacle set during October in the Bay, lower Patuxent River, and Piney Island Swash.

A survey of oyster bars in Chesapeake Bay, Tangier Sound, Choptank River, and Potomac River was made in the fall of 1959 in cooperation with Maryland's Department of Tidewater Fisheries and the U. S. Bureau of Commercial Fisheries. This showed a generally better set than that of last year but again no heavy sets were found. Practically no setting occurred at the head of the Bay and along the western shore above Flag Pond (Calvert County). Catches on natural cultch generally ranging from about 20 to 150 per bushel were found along the eastern side of the Bay below Kent Point, the western side below Cove Point, in the lower Choptank River, Tangier Sound, and the extreme upper and lower parts of the Potomac River. The highest count recorded was 890 spat per bushel on newly-planted shells off Pry Cove in Holland Straits.

The smaller tributaries of the Chesapeake Bay, where setting usually is heaviest, were not examined. Especially in the southern half of the State, many of the spat were from a late set and were quite small. For that reason further counts were postponed until spring 1960 when the spat would be larger and less difficult to recognize in the field. (Special Oyster Bulletin, 59-29E, Chesapeake Biological Laboratory, Solomons, Md.)

Salmon

COLUMBIA RIVER CATCH NORMAL IN 1959:

The commercial catch of salmon and steelhead on the Columbia River in 1959 was quite comparable to that of recent years, about 7.05 million pounds.

The spring chinook run was down, summer-run chinook were in relatively good abundance, and although the fall chinook catch was the lowest on record, the escapement of fall chinook was quite good as compared with recent years. Egg takes of fall chinook at U. S. Fish and Wildlife Service hatcheries were second only to the record year of 1958. There has been an encouraging return of adult silver salmon to the Service's new Eagle Creek hatchery.

Three new hatcheries, constructed under the Columbia River Fisheries Development Program went into operation in the fall of 1959; they are the Gnat Creek hatchery in Oregon and the Kalama and Abernathy hatcheries in Washington.

* * * * *

HEARING ON FISH-HANDLING FACILITIES AT OXBOW DAM:

The Federal Power Commission granted the Idaho Power Company a hearing on an existing order which prescribes the construction of permanent fish-handling facilities at Oxbow Dam in the Pacific Northwest. The hearing took place on December 7, 1959.

The Department of the Interior notified the Commission that it did not see the need for the scheduled hearing. The Department recommended that the Commission direct the company to proceed with the construction of the facilities already ordered for the Oxbow Dam powerhouse and that appropriate plans be developed for passing both upstream and downstream migrants at Hell's Canyon Dam.

The Company advocates the elimination of the fish protective facilities at Oxbow Dam and the construction of similar facilities at their lowermost dam, Hells Canyon. In so doing, the streams tributary to the Hells Canyon reservoir would be taken out of production and the fish would be subjected to a longer truck-hauling trip which, in turn, would subject them to greater hazards.

South Atlantic Exploratory Fishery Program

HARD CLAMS FOUND IN COMMERCIAL QUANTITIES OFF NORTH CAROLINA COAST:

M/V "Silver Bay" Cruise 20: Exploratory clam and scallop dredging and fish and shrimp trawling operations were conducted off the North Carolina coast during the 23-day cruise of the U. S. Bureau of Commercial Fisheries chartered fishing vessel Silver Bay, which ended on December 13, 1959.

CLAMS: Preliminary test fishing, using a 14-tooth Fall River clam dredge, from 10 miles west of Beaufort Inlet to Cape Lookout, N. C., yielded catches of hard clams (Mercenaria sp.) that indicate the presence of an extensive commercial clam bed from about 4 miles west of the inlet to Cape Lookout. This area (see Chart A p. 43) had been previously tested with a hydraulic dredge with unsatisfactory results. Catch rates

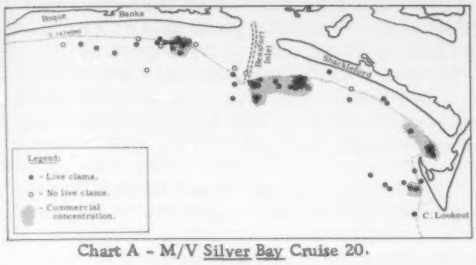


Chart A - M/V Silver Bay Cruise 20.

varied from 0 to 6½ bushels per 30-minute drag throughout the area. Simulated commercial fishing using a single dredge at 34°39.7' N. lat., 76°38.3' W. long. (about two miles east of the inlet) in 4 to 6 fathoms, produced 45 bushels of large (3" to 4") hard clams in 6 hours.

Dredging in the vicinity South and Southwest of Cape Lookout Bight produced clams at varying rates up to 5 bushels per hour. Seven stations south of Drum Inlet yielded large quantities of dead shells, but no live clams.

Clam sizes varied from 2" to 5", but were predominantly large or chowder size (over 3"). One bushel yielded approximately one gallon of meats.

SCALLOPS: A total of 14 drags were made with an 8-foot scallop dredge (see Chart B). No new areas were located. Meat yield from sampling drags made in the previously reported area east of Core Banks ran approximately 3½ pints per bushel--about 30 percent lower than during September 1959.

SHRIMP: No commercially-significant catches of shrimp were made during the cruise. A few white, brown, and pink shrimp were caught in some of the shallower trawl tows.

FISH TRAWLING: A 54/74-foot two-seam fish trawl utilizing 6-inch wooden rollers and constructed of 4½ inch stretched-mesh netting was used at 31 trawling stations. Twenty-five of the drags were made between Cape

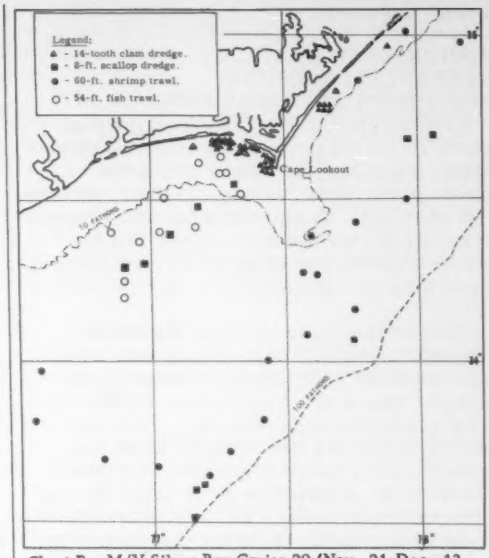


Chart B - M/V Silver Bay Cruise 20 (Nov. 21-Dec. 13, 1959).

Fear and Cape Lookout, N. C. Mixed fish catches were highest in the 12-14 fathom depth range with catches ranging from 350 to 3,400 pounds per hour.

Fig. 1 - A load of hard clams on the deck of the M/V Silver Bay.

Catches consisted primarily of small croakers, porgies (Stenotomus), and butterfish (7-8 per pound). Large anchovies were numerous in some of the drags.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, OCTOBER-DECEMBER 1959:

Oyster Research: The majority of South Carolina oysters are produced between the tides, but there are a few areas in the State where subtidal oysters are growing. These subtidal oysters are in areas of low salinity where the inroads of boring sponge have been controlled by fresh water.

The seven-year cycle of extreme drought ended in 1947. Since then rainfall has been near normal. During the drought years the deep-water oyster beds gradually deteriorated. Now that salinity over the deep-water beds has returned to a more favorable low, the Bears Bluff Laboratories is undertaking a fairly large-scale rehabilitation of one of these oyster beds in the Ashepoo River. The potential deep-water beds in that river have been located and ranges for determining their exact position have been set up in the marshes upstream from the Interacoastal Waterway almost to Bennetts Point. This covers a distance of approximately 3,000 yards.

Intertidal oysters from a higher salinity area near the mouth of Ashepoo are now being moved to these deep-water beds. It is projected that several hundred bushels of seed will be moved monthly, so that the effect of seasonal transplantation can be noted. The entire program is planned sufficiently large to demonstrate the feasibility of rehabilitating the State's deep-water beds. It is realized that successful planting largely depends on continuing normal precipitation.

Damage to oysters in South Carolina as a result of Hurricane Gracie was apparently rather light and scattered. It is probable that this damage, evident in the form of excessive mortality in certain areas, was due in part to wave action associated with the ebb of the storm tide and in part to the excessive rainfall during the several weeks following the storm. Despite this rainfall, however, a heavy set of spat extending into the first week of October was noted in most areas.

Data accumulated over the past several years comparing the mortality, growth, and periods of best growth of oysters in the Laboratories' oyster pond and in racks under the Laboratories dock in outside waters, has been tabulated and consolidated.

Shrimp Research: Experimental trawling was carried out regularly throughout this quarter. Comparison was made of trawl catch records for November 10-December 8, 1958, and the same period in 1959, using catch per unit of effort as a measurement of abundance of croaker, spot, and commercial shrimp. Trawl stations were grouped into three categories: rivers, sounds, and offshore. Catch data was then tabulated to determine relative abundance at each of these areas for the 1958 and 1959 periods.

This analysis reveals that spot and brown shrimp, very abundant in the sounds and offshore in 1958, were few in number at all locations in 1959. On the other hand, croaker and white shrimp were found to have increased quite markedly in the rivers in 1959, and to a lesser extent in the sounds. The great increase in white shrimp possibly is the result of the high precipitation and correspondingly lower salinities observed during 1959. It is more likely, however, that the comparative abundance of white shrimp in 1959 represents the comeback of the species following the killing winter of 1957/58, during which practically all the brood stock was destroyed.

Pond Culture: A shallow, one-quarter acre experimental salt-water pond at Bears Bluff was drained December 1, 1959, just after the onset of cold weather. It was found that the drop in temperature had resulted in the total mortality of the commercial shrimp which had been stocked in the pond. The harvest was small--only 64 shrimp were collected when the pond was drained. Presumably the susceptability to predators and low temperatures caused the failure of the shrimp crop in the pond. When the pond was refilled, the stocking of fluke in it was begun in an attempt to cultivation of that species. To date, a number of Southern fluke and small forage fishes have been released in the pond, and stocking will continue into next year.

The three commercial shrimp ponds built in the marshes near the upper end of St. Helena Sound, all suffered damage from Hurricane Gracie. In two of them the dams were completely breached, the flood gates washed away, and extensive repairs will be necessary. The third pond, more sheltered from the wave action of the hurricane, withstood the storm, but its dikes were completely inundated by hurricane tides, thus making the harvest from the pond suspect. The pond was harvested with difficulty in November 1959. The difficulties encountered were largely engineering. The results were not spectacular, but were sufficiently good to encourage further attempts at pond cultivation of shrimp as a commercial venture. (Progress Report No. 42, Bears Bluff Laboratories, Wadmalaw Island, S. C.)

Note: See Commercial Fisheries Review, December 1959 p. 59; October 1959 p. 36.

Striped Bass

MARYLAND HAS RECORD CATCH IN 1959:

The 1959 commercial catch of striped bass (or rock fish) was the largest in Maryland history, reports the State's Chesapeake Biological Laboratory, Solomons, Md. The supply of this fish also looks good for 1960.

The catch for the first nine months of 1959 was 3.8 million pounds, or 0.9 million pounds greater than the 12-months total for 1958. The 1958 catch was one of the best years previously reported.

The catch during the summer quarter (July, August, September), a traditionally slow period, was just above 0.5 million pounds in the Chesapeake Bay and tributaries, 50 percent greater than in the same 1958 quarter. Although the haul seines take the lion's share, only four-fifths of the gear was in use in 1959. The unusual summer catch followed record catches in the winter and spring of 1959.

The record catch verifies a prediction made last winter by the Laboratory, which also predicts that 1960 should equal or exceed 1958 and possibly 1959. If this occurs, Maryland commercial fishermen will have three years of good striped bass catches.

The striped bass catches follow a general upward trend despite a continuing relatively stable commercial fishery and a mushrooming sports effort. Only one jarring note has popped up to date. The Director said "We've heard that sports fishing luck has been spotty. Some anglers did well, but others complained that fishing was poor in 1959.

"One thing is certain, as revealed by the commercial catch: the fish were out there to be caught--winter, spring, and summer.

"No one can say with certainty whether the over-all angling catch was poor or not," the Director continued, "because Maryland has no state-wide system for determining the sports catch. There is urgent need for accurate data on our tremendous and important recreational fishery. With such data, the research agency can vastly improve understanding of Maryland's fisheries, improve fish crop forecasting, and effectively aid in developing the wisest and best use of Maryland's fish."

He has proposed a starting point for gathering such information, by licensing for-hire boats and requiring regular catch reports. The proposal will be presented to the 1960 session of the Maryland Assembly.

United States Fishery Landings

JANUARY-NOVEMBER 1959:

Landings of fish and shellfish in the United States during the first 11 months of 1959 were about 9 percent more than for the same period of 1958. Landings, amounting to 4.3 billion pounds, were 336 million pounds more than in the same period of 1958, indicating that the domestic catch of fishery products for the year 1959 would amount to about 5.05 billion pounds.

The principal increase in production occurred in the landings of menhaden--estimated to reach 2.2 billion pounds by the end of 1959. Such an increase (approximately 636 million pounds) over the 1.5-billion-pound catch of 1958 would also exceed the record menhaden catch of 2.1 billion pounds established in 1956. A gain was also reported in the production of Alaska herring--up 21 million pounds over 1958. The Alaska salmon fishery, however,

Table 1 - United States Fishery Landings of Certain Species for Periods Shown, 1959 and 1958 1/

Species	Period	1959	1958	Total 1958
		(1,000 lbs.)		
Anchovies, Calif.	10 mos.	2,400	6,922	11,603
Cod:				
Maine	10 mos.	2,500	2,600	2,735
Boston	11 "	16,600	15,436	16,183
Gloucester	11 "	2,900	2,895	3,189
Total cod		22,000	20,931	22,107
Haddock:				
Maine	10 mos.	3,000	3,600	3,997
Boston	11 "	67,900	78,593	81,509
Gloucester	11 "	11,900	9,415	9,798
Total haddock		82,800	91,608	95,304
Halibut 2/:				
Wash. and Oreg.	10 mos.	17,700	15,600	16,088
Alaska	10 "	21,500	20,000	20,000
Total halibut		39,200	35,600	36,088
Herring:				
Maine	10 mos.	109,100	154,100	170,977
Alaska	Year	110,000	88,801	88,801
Industrial fish:				
Maine & Mass. 3/	11 mos.	102,400	123,600	126,388
Mackerel, Calif.:				
Jack	10 mos.	24,800	19,406	22,066
Pacific	10 "	33,100	15,710	27,648
Menhaden	Year	2,185,000	1,549,098	1,549,098
Ocean perch:				
Maine	10 mos.	65,300	63,847	71,068
Boston	11 "	3,000	2,439	2,625
Gloucester	11 "	57,000	72,595	74,951
Total ocean perch		125,300	138,881	148,644
Salmon:				
Wash. 4/	10 mos.	36,400	49,118	54,363
Oreg. 4/	9 "	4,700	7,736	8,179
Alaska	Year	141,700	241,255	241,255
Sardines, Pacific	thru Dec. 11	63,300	189,296	207,446
Scallops, sea, New Bedford (meats)	11 mos.	17,500	14,330	15,253
Shrimp (heads-on):				
South Atl. & Gulf	10 "	182,300	161,344	195,938
Washington	10 "	2,900	6,556	6,730
Oregon	9 "	2,700	1,395	1,523
Alaska	10 "	11,500	6,293	7,862
Squid, Calif.	9 "	15,700	4,862	7,457
Tuna, Calif.	thru Dec. 5	265,700	299,810	304,094
Whiting:				
Maine	10 mos.	23,300	23,577	23,577
Boston	11 "	600	581	596
Gloucester	11 "	62,100	58,603	58,927
Total whiting		86,000	82,761	83,100
Total of all above items		3,666,500	3,309,413	3,431,924
Others (not listed)		597,100	618,341	1,303,921
Grand total		4,263,600	3,927,754	4,735,845

1/Preliminary. 3/Excluding menhaden.
2/Dressed weight. 4/Landed weight.

Table 2 - United States Fishery Landings by States for Periods Shown, 1959 and 1958 1/

Area	Period	1959	1958	Total 1958
		(1,000 lbs.)		
Maine	10 mos.	241,400	286,101	316,955
Massachusetts 2/:				
Boston	11 mos.	104,200	115,412	123,764
Gloucester	11 "	224,400	222,212	230,218
New Bedford	11 "	103,100	106,821	111,669
Provincetown	11 "	26,700	24,885	25,754
Total Mass.		458,400	469,330	491,405
Rhode Island 3/	10 mos.	96,700	92,443	104,610
New York 3/	10 "	31,500	34,369	42,063
New Jersey 3/	10 "	46,400	41,872	50,933
North Carolina 3/	10 "	54,200	49,133	54,866
South Carolina 3/	10 "	15,300	13,426	15,359
Georgia	10 "	17,600	17,186	20,066
Florida 3/	10 "	107,100	120,189	158,724
Alabama	8 "	9,600	6,906	10,343
Mississippi 3/	8 "	12,700	9,947	82,476
Louisiana 3/	5 "	24,600	28,800	75,237
Texas 3/	10 "	70,300	66,262	80,478
Ohio (Mar.-Sept.)	9 "	15,900	15,200	19,145
Oregon 2/	10 "	46,900	54,340	59,467
Washington 2/	10 "	124,800	133,463	164,987
California 2/:				
Certain species 4/	10 mos.	405,000	536,006	580,314
Other	7 "	50,900	52,604	94,570
Total Calif.		455,900	588,610	674,884
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	Year	2,149,600	1,545,265	1,545,265
Alaska:				
Halibut 5/	10 mos.	21,500	20,000	20,000
Herring	Year	110,000	88,801	88,801
Salmon	Year	141,700	241,255	241,255
Shrimp	10 mos.	11,500	4,856	7,862
Total of all above items		4,263,600	3,927,754	4,325,181
Others (not listed)		6/	6/	410,664
Grand total		6/	6/	4,735,845

1/Preliminary.
2/Landed weight.
3/Excluding menhaden.
4/Includes catch of anchovies, jack and Pacific mackerel, Pacific sardines, squid, and tuna. Data on tuna are through December 5 and on Pacific sardines through December 11. Data on squid are for first nine months.
5/Dressed weight.
6/Data not available.
Note: Data principally represent weight of fish and shellfish as landed except for mollusks which represent the weight of meats only.

experienced a disastrous year with the catch falling to about 142 million pounds--nearly 100 million pounds below the 1958 level and the lowest since 1900.

Compared with the same period of the previous year, California tuna landings through December 5, 1959, amounting to 266 million pounds, were down 34 million pounds and the catch of Pacific sardines through December 11--63 million pounds--was 126 million pounds less

than the 1958 landings. In New England the catch of haddock was down 9 million pounds compared with the first eleven months of 1958 and landings of industrial fish (used in the manufacture of meal and oil) fell 21 million pounds during the same period. Landings of ocean perch and Maine herring, for which ten-months figures are available, were also down sharply.

Landings of shrimp were about 24 million pounds greater than in 1958. Most of the increase occurred in Louisiana, Texas, and Alaska. Landings in Florida were down sharply.

* * * * *

LANDINGS IN 1959 EXCEEDED 5 BILLION POUNDS:

The United States domestic fish catch in 1959 exceeded 5 billion pounds for the second time in history, according to the U. S. Bureau of Commercial Fisheries. The record was 5.3 billion pounds in 1956; the 1958 catch was 4.73 billion pounds. (Landed weight, except that mollusks are weight of meats only.)

Shrimp trawlers docked at Brownsville, Tex.

The catch of menhaden in 1959 of 2.2 billion pounds exceeded the previous record of 2.1 billion pounds landed in 1956.

For the first time, the landings of fish used for other than human food exceeded that used for human food.

The larger catch in 1959 was due to the big increase in the catch of menhaden. Menhaden is the Nation's most important industrial fish. The 1959 harvest of that species was more than half a billion pounds greater than the 1958 harvest, and more than offset, in poundage, the decreases in landings of salmon (100 million pounds), California sardines (130 million pounds), tuna (35 million pounds), Maine herring (45 million pounds), ocean perch (13 million pounds), and haddock (9 million pounds).

The "other than human food" category includes menhaden (which in 1959 made up 43 percent of the total United States landings), Alaska herring (2 percent), other species used for pet and other animal food, and mussel shells manufactured into buttons.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, OCTOBER 1959:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during October 1959 increased by 18.1 percent in quantity and 16.3 percent in value as compared with September 1959. The increase was due primarily to higher imports of groundfish fillets and blocks (up 14.2 million pounds), and frozen shrimp (up 7.8 million pounds), and to a lesser degree, an increase in the imports of canned tuna in brine. The increase was partly offset by a 0.4-million-pound decrease in the imports of lobster and spiny lobster.

United States Foreign Trade in Edible Fishery Products, October 1959 with Comparisons

Item	Quantity			Value		
	October		Year	October		Year
	1959	1958	1958	1959	1958	1958
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen, & processed 1/. .	112.8	98.3	956.8	29.9	27.9	278.4
Exports:						
Fish & shellfish: Processed only (excluding fresh and frozen) . .	6.3	11.1	41.2	1.9	5.8	15.6

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

Compared with October 1958, the imports in October 1959 were up by 14.8 percent in quantity and 7.2 percent in value due to higher imports of groundfish fillets and blocks (up 5.7 million pounds), frozen albacore and other tuna (up 4.6 million pounds), and frozen shrimp (up 3.8 million pounds). Lower imports of lobster and spiny lobster (down 1.2 million pounds) partially offset the increases.

United States exports of processed fish and shellfish in October 1959 were lower by 18.2 percent in quantity and 50.0 percent in value as compared with September 1959. Compared with the same month in 1958, exports in October 1959 were lower by 44.7 percent in quantity and 67.2 percent in value because of the light pack of California sardines and Pacific salmon available for export to foreign markets. Exports of Pacific salmon to the United Kingdom from the 1959 pack were made prior to October this year.

* * * * *

GROUNDFISH FILLET IMPORTS, NOVEMBER 1959:

During November 1959, imports of groundfish (including ocean perch) classified as fillets into the United States amounted to 4.3 million pounds, according to data obtained from the U. S. Bureau of Customs.

Canada was the leading supplier with 2.5 million pounds, or 58 percent of the month's total. Iceland was next with 1.5 million pounds. Imports from six other countries made up the remaining 302,000 pounds.

During the first eleven months of 1959, imports of groundfish and ocean perch classified as fillets (but not including fish fillet blocks since September 15, 1959) into the United States totaled 141.7 million pounds. Canada, with 73.2 million pounds accounted for 52 percent of the 1959 eleven-months total. Imports from Iceland (37.0 million pounds) represented 26 percent of the total, while Denmark followed with 14.1 million pounds, or 10 percent, and Norway with 11.4 million pounds, or 8 percent. Seven other countries supplied the remaining 6.0 million pounds, or 4 percent.

Note: See Chart 7 in this issue.

Wholesale Prices, December 1959

The December 1959 wholesale price index (122.7 percent of the 1947-49 average) for edible fishery products (fresh, frozen, and canned) continued to vary over a narrow range as compared with the preceding month (up 1.7 percent) and the previous nine months. The December 1959 wholesale price index was down 9.0 percent compared with the same month of 1958. The over-all wholesale price index in April 1959 stood at 122.7 percent and during the April-December 1959 period has varied from a high of 123.5 percent in June to a low of 119.8 percent in August. The December 1959 wholesale price index at 122.7 percent was the lowest since 1955 (122.6 percent).

Due to substantially higher wholesale prices for large drawn haddock at Boston and fresh round whitefish at New York, plus slight increases for frozen halibut and salmon, the drawn, dressed, and whole finfish subgroup price index increased 5.2 percent from November to December 1959. The increase was partially offset by lower wholesale prices for fresh yellow pike and Lake Superior drawn whitefish at Chicago. Compared with December 1958, prices were lower by 12.8 percent. All of the subgroup items were lower in December 1959 as compared with the same month in 1958. Prices for large drawn haddock at Boston were down 30.3 percent, Lake Superior whitefish down 38.0 percent, frozen halibut lower by 7.5 percent, fresh yellow pike down 9.2 percent, frozen king salmon down 3.2 percent, and round whitefish lower by 2.7 percent.

Fig. 1 - Unloading fish from a trawler at the Boston Fish Pier.

Fresh processed fish and shellfish wholesale prices in December 1959 were up slightly (0.4 percent) from the preceding month. Higher primary wholesale prices for fresh haddock fillets (up 8.9 percent) more than offset a drop of about 1/2 cent a pound in fresh shrimp prices at New York. Shucked oyster prices were unchanged from November to December. From December 1958 to December 1959, the subgroup index declined 9.1 percent, with prices for haddock fillets down 21.0 percent and fresh shrimp down 26.7 percent. Higher shucked oyster prices partially offset the lower prices for shrimp and haddock.

The wholesale price index for frozen processed fish and shellfish in December 1959 was about unchanged from the preceding month. Frozen headless shrimp at Chicago advanced (2.1 percent) for the second straight month and more than compensated for a 2.4-percent drop in frozen haddock and a 0.7-percent drop in flounder fillet prices. In December 1959 a sharp drop (23.7 percent) occurred in the wholesale price index for this subgroup as compared with the same month of 1958. The decrease was due to sharply lower prices for frozen shrimp down 29.5 percent, at Chicago, haddock fillets (down 24.4 percent), ocean perch fillets (down 12.9 percent), and flounder fillets (down 9.7 percent).

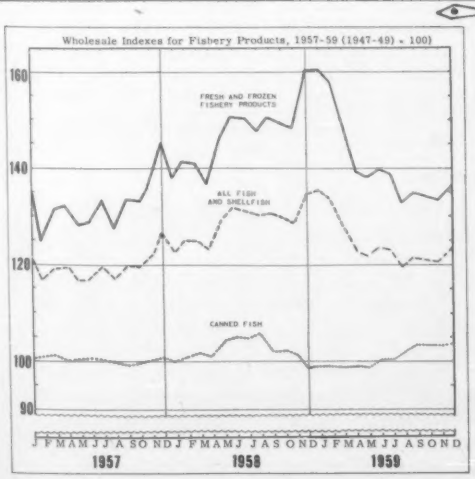
Primary broker prices for canned fish in December 1959 increased by a fraction of one percent due to a 50-cents a case increase in the California sardine price as compared with November 1959. The pack at the end of the season on December 31, 1959, of 745,000 cases was down 67 percent from the 2,256,000 cases packed in 1958. Other subgroup canned fish prices were unchanged from November to December 1959. Fish canning activity was confined largely to tuna in December. Nearly all canned items were in lighter supply at the end of 1959 as compared with the end of 1958. Increases in the primary prices for canned pink salmon (up 13.9 percent) and Maine sardines (up 3.3 percent) from December 1958 to December 1959 resulted in an increase of 5.6 percent in the canned fish subgroup index. Higher prices for those two items were partially offset by lower prices for California tuna (down 1.8 percent) and California sardines (down 3.1 percent).

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, December 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Dec. 1959	Nov. 1959	Dec. 1959	Nov. 1959	Oct. 1959	Dec. 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					122.7	120.7	121.1	134.8
Fresh & Frozen Fishery Products:					136.4	133.4	134.0	160.1
Drawn, Dressed, or Whole Finfish:					154.8	147.2	153.8	177.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.16	.13	163.9	129.2	127.9	235.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.31	96.4	95.9	98.5	104.2
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.76	.75	171.3	168.5	177.2	176.9
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.47	.73	115.3	179.7	185.9	185.9
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.88	.63	177.0	126.4	202.3	182.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.59	.70	138.4	164.2	161.8	152.4
Processed, Fresh (Fish & Shellfish):					134.6	134.0	128.9	148.0
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.49	.45	166.7	153.1	144.6	211.0
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.65	.65	101.9	102.7	98.7	139.0
Oysters, shucked, standards	Norfolk	gal.	7.00	7.00	173.2	173.2	167.1	148.5
Processed, Frozen (Fish & Shellfish):					106.8	106.4	106.4	140.0
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.1	98.8	99.5	108.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.31	.32	97.3	99.7	102.0	128.7
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.8	108.8	108.8	124.9
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.64	.63	98.4	96.4	95.3	139.6
Canned Fishery Products:					103.8	103.4	103.4	98.3
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	112.2
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	79.3
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	7.50	93.9	88.1	88.1	96.9
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	90.1

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Note: Corrections for figures previously published: Indexes for September 1959: Fillets, flounder, skinless, 1-lb. pkg., 96.8.



SALES CONTESTS FOR WHOLESALERS DESCRIBED IN NEW LEAFLET

The Small Business Administration has recently issued a leaflet on sales contests for wholesalers. A well-planned contest can boost the salesmen's morale as well as increase the firm's sales. The five steps, outlined in this leaflet, that are involved in setting up a successful contest are: (1) establishing the purpose, (2) deciding on a scoring method, (3) selecting a theme and prizes, (4) promoting, and (5) awarding the prizes.

Write to the Small Business Administration, Washington 25, D. C., for a free copy of Sales Contests for Wholesalers, Small Marketers Aids No. 47.

International

EUROPEAN FREE TRADE ASSOCIATION

CONVENTION INITIALED BY SEVEN EUROPEAN COUNTRIES:

The Convention for the European Free Trade Association (EFTA), to go into force on July 1, 1960, was initialed by Cabinet Ministers of Norway, Sweden, Denmark, Great Britain, Austria, Switzerland, and Portugal on November 20, 1959, at a two-day meeting in Stockholm. Initialing of the 400-page document followed a last minute British decision extending free trade status to frozen fish fillets on certain conditions.

The "Outer Seven" or EFTA representatives issued a communique emphasizing that establishment of EFTA was viewed as only a step toward an agreement among all 18 members of the Organization for European Economic Cooperation (OEEC), which also includes the six nations now joined in the European Economic Community or "Common Market," namely West Germany, France, Italy, Belgium, the Netherlands, and Luxembourg. Under the EFTA Convention, import tariffs in force on January 1, 1960, are due to be reduced 20 percent as of July 1. Subsequent tariff cuts, at the rate of 10 percent a year, are designed to achieve a free internal market among the Outer Seven after a 10-year transition period.

Following the Stockholm conference, the respective governments were slated to examine every provision in the convention, with the final signing expected to take place in mid-December. Thereafter, each of the national assemblies will consider ratification of the pact.

According to a dispatch appearing in the Oslo newspaper Arbeiderbladet for November 21, the dispute between Great Britain and Norway over the position of frozen fish fillets within the Outer Seven area was not settled until the last minute. During the negotiations, Norway won acceptance of its principal objective, that all industrially processed fish products, including frozen fish fillets and frozen shrimp, should be considered as industrial products and thus enjoy free trade status within the Outer Seven area. At the end, British negotiators agreed to raise the joint Scandinavian quota for frozen fish exports to Great Britain from 20,000 to 24,000 metric tons a year over a transition period of ten years. At present, these exports total about 6,000 tons a year. Should frozen fish exports exceed the accepted quota to such a degree that they seriously disturb internal distribution in Great Britain, the whole question is to be re-examined. And if new negotiations fail to bring a solution, Britain reserves the right to impose import tariffs on all frozen fish from Scandinavia, including Norway.

The British Board of Trade President as well as the Norwegian Commerce Minister expressed the view that such an extreme development is virtually inconceivable. And the Norwegian Fisheries Minister said the British quota should allow for a natural expansion of the Norwegian fish filleting industry until 1970. (News of Norway, November 26, 1959.)

Note: Also see Commercial Fisheries Review, October 1959, p. 46.

FISH MEAL

INTERNATIONAL CONFERENCE OF MANUFACTURERS HELD IN SPAIN:

Representatives from 16 countries attended the International Fish Meal Manufacturers Conference in Madrid, Spain, during the latter part of October 1959.

By a unanimous vote it was decided that an International Association should be formed. This Association will be primarily for the purpose of promoting the exchange of scientific and technical information and of examining all matters

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which are of general interest to the industry, such as standards of quality and International regulations and legislation. The President of the United Kingdom Fish Meal Manufacturers Association will be the Association's first president, and the Secretariat will be provided by the United Kingdom. (Fishing News, November 6, 1959.)

FOOD AND AGRICULTURE ORGANIZATION

REPORT OF THE TENTH SESSION OF THE FAO CONFERENCE:

On October 31, 1959, the Food and Agriculture Organization (FAO) of the United Nations convened its Tenth Conference in Rome, Italy. Eighty-six nations participated in the proceedings of the Conference. Among these nations were a number from Africa who were admitted to membership or associate membership. Guinea, Cyprus, Nigeria, Somalia, Cameroon, and Togo were elected new members, the membership of all but Guinea being contingent on the attainment of independence in 1960. Chad, Gabon, Madagascar, Federation of Rhodesia and Nyassaland, Senegal, and Soudan were the new associate members.

The Conference, which is the chief legislative and policy-making organization of the FAO, had before it a wide variety of tasks including consideration of program of work and budget for 1960 and 1961; discussion of the state of food and agriculture throughout the world; constitutional, legal, and administrative matters; and such special topics as the proposed Freedom from Hunger Campaign and the Mediterranean Development Project. The meetings lasted three weeks and ended on November 20, 1959.

B. R. Sen, of India, was reelected Director-General of FAO for a four-year term. A 1960-61 budget of $21,536,850 was adopted, of which $1,491,605 was allocated to the Fisheries Division for the two-year period.

The U. S. Delegation to the Conference consisted of agriculture, fishery, forestry, nutrition, programming, and fiscal specialists from various Government departments, as well as representatives from industry. United States fishery advisers on the delegation included Sidney Shapiro, Chief, Branch of Special Reports, U. S. Bureau of Commercial Fisheries; Wilbert M. Chapman, Director of Research of the American Tunaboat Association; and Charles N. Carry, Executive Director, California Fish Canners Association.

At the Conference's first plenary meeting, Richelieu Morris, of Liberia, was elected chairman. Commissions were then established to work on the various activities of the FAO. Commission I dealt with such matters as the world food and agriculture situation, the Freedom from Hunger Campaign, and the Mediterranean Development Project. Commission II dealt with the current and future activities of the various technical divisions of FAO. Commission III was concerned with constitutional, administrative, and financial problems. The work of the fishery advisers on the U. S. Delegation was conducted primarily in the Technical Committee on Fisheries, established under Commission II.

Technical Committee on Fisheries: The first meeting of the Technical Committee was held on November 3, at which time it adopted the agenda and appointed A. L. Pritchard of Canada, Chairman, and T. S. Leach of the United Kingdom and S. F. Humphrey of Australia, Vice Chairmen. Representation at the meetings of the Technical Committee was excellent, delegates from 46 countries being present.

At the opening session of the Fisheries Committee, Dr. D. B. Finn, Director of FAO's Fisheries Division, made a general statement emphasizing future programs. Key points in his talk were the

Fig. 1 - United States Delegation to FAO's 10th Conference held in Rome, Italy.

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need for resource appraisal and for establishing fishery administrative systems in underdeveloped countries. He also noted that there is a lack of skilled personnel available to conduct FAO's fisheries programs. R. H. Fiedler, Chief of the Program Coordination Service of the Fisheries Division, discussed the Expanded Technical Assistance Program. The meeting then proceeded with a report by Allan Tubb, Executive Secretary of the Indo-Pacific Fisheries Council (IPFC). He was followed by Mr. Girard, Executive Secretary of the General Fisheries Council for the Mediterranean (GFCM). At subsequent sessions of the Technical Committee, the Chiefs of the Branches of Biology, Technology, and Economics reported on their present and future programs of work.

United States Proposals for World Conferences: The Technical Committee recognized the value of holding world conferences in various fishery fields as a potent means of furthering the objectives of FAO. The reports of such conferences of experts form the basis for creative action, and determine the direction that future activities should take.

Fig. 2 - Delegates at the opening Plenary Session of FAO's 10th Conference held in Rome, Italy.

Two major proposals by the U. S. Delegation for world conferences were accepted and written into the report of the Technical Committee. The first proposal, dealing with a world conference on the tunas and related species, was received favorably,

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and the Committee requested the Director-General to go into the possibility of organizing this symposium as a joint activity of the Fisheries and Nutrition Divisions, subject to the availability of funds.

Regional Fishery Organizations: The Committee requested in a resolution that the Director-General explore the possibility of establishing a regional fishery consultative body for West Africa, similar to the Indo-Pacific Fisheries Council and the General Fisheries Council for the Mediterranean. Another resolution requested the Director-General to study the possibility of creating a regional fisheries commission to serve the Governments of the American countries of the South Atlantic in a form similar to that of other FAO regional fisheries councils or commissions.

REPORT OF THE TECHNICAL COMMITTEE IN FISHERIES: At the fifth meeting of the Technical Committee on Fisheries, the delegates approved a report, which was then presented to Commission II. Subsequently the report was adopted with minor changes by the Conference. The report is as follows:

204. Fisheries: The Conference considered that the proposed program of work in the field of fisheries was well conceived and that, within the limits of the funds available, a balanced selection had been made of the fields of activity undertaken. It therefore approved the projected activities as set out in Documents C 59/3 and C 59/FI/4, subject to the comments which follow.

205. The Conference emphasized that the Director-General should endeavour to select for continuous work those biological, economic, technological, and other activities which are fundamental to the aims of the Organization. It was in this context that the Conference considered in detail the proposed program.

206. The Conference laid considerable stress on the need for an integrated approach to fishery problems. It noted with satisfaction that all the branches of the Fisheries Division were collaborting intimately in carrying out the program and expressed the hope that these working relationships would continue.

207. The Conference suggested that the Director-General, in reviewing future trends should endeavor to ensure that adequate resources were made available to the Fisheries Division to enable it to meet more fully the increasing demands by many Member Governments for services arising from growing concern with fisheries development, taking into account the over-all needs of the Organization.

208. The Conference recognized that the holding of expert meetings in various fishery fields was one of the most potent means of furthering the objectives of the Organization; in this connection, the comprehensive reports emerging from such meetings, for instance, those on Costs and Earnings of Fishery Enterprises, on the Economics of Fisheries, on Boats, and on Gear had broken new ground and formed the basis for new creative thought and action and for the direction that future activities and research should take. This was also the case with the meetings on Fishery Cooperatives and on the Biology of Sardines, the printed reports of which were not yet available. The Conference also endorsed and commended the extensive use of consultants as an effective means of dealing with the very wide range of subject matter covered by the Fisheries Division.

209. The progress of the Expanded Technical Assistance Program was noted with statisfaction, but the downward trend in requests from governments for assistance in the field of fishery economics was regretted, in view of the importance of this discipline in evolving fisheries development programs. Closer technical supervision of recipients of fellowships was suggested. The Conference noted that the Organization was likely to be invited by the UN Special Fund to act as Executing Agent for two fishery projects in the near future, and that this would place an additional load on the professional staff of the Fisheries Division.

210. Fisheries Biology: The Conference noted with regret that due to lack of funds certain documents of the greatest value, such as Fishing Gear of the World, and the Current Bibliography for Aquatic Sciences and Fisheries, were published in English only and that this situation was likely to persist for the ensuing biennium. The Conference therefore requested the Director-General to avoid the recurrence of similar situations either through an increased over-all budget allotment for publications, or a suitable revision of the publications program in order that all documents published be available simultaneously in the three official languages of FAO.

211. The Conference endorsed the work being carried out and the program proposed in the field of fisheries biology. The Conference commended the progress made in the development of a methodology for collecting and storing information over a very wide field, and recognized that by these methods the production of a wide series of documents was made possible. The Conference also endorsed the proposal to publish in English the Current Bibliography for Aquatic Sciences and Fisheries (hitherto an internal document), in printed form through the medium of a commercial publisher, as an exceptional measure. The Conference also approved the preparation and issue of a series of manuals on a wide variety of biological and oceanographic subjects.

212. It was noted that during the biennium a number of fruitful expert meetings and training centers had been held; these included the World Scientific Meeting on the Biology of Sardines and Related Species, and the Training Center on the Methodology and Techniques of Research on Mackerel (Rastrelliger), the reports on which had proved particularly timely and valuable. The Conference approved, subject to the availability of funds, the continuation of a series of such meetings in the ensuing biennium especially dealing with important species of fish. The program for 1960/61 already included one on the Biology of Tuna, and a second, a Symposium on Fish Culture which would embrace biological, technological and economic aspects of the subject matter. A meeting on Hilsa should be held in the ensuing or a succeeding biennium if funds permitted.

213. Some delegations recommended further regional fishery studies such as that on the Me-

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kong River Basin; other delegations stressed the need for FAO assistance with the establishment of a training and research institute in inland fisheries at an appropriate place in the area. Some delegations also recommended that the problems arising from pollution of marine and inland waters should receive special attention. The Conference requested the Director-General to give these matters the attention that available staff and funds would permit.

214. The Conference commended the collaboration which the Organization had developed with other international governmental and nongovernmental organizations, specifically the relations with UNESCO and the International Scientific Unions, on fishery aspects of oceanographic research, especially in the Indian Ocean. It also noted with pleasure the acknowledgment contributed by the Observer from the International Union for the Conservation of Nature and Natural Resources, of fruitful collaboration with that body.

215. Fisheries Technology: The work accomplished in the field of fisheries technology was commended and the programs in the fields of fish processing and of fishing craft and gear were endorsed. The Conference noted that during this biennium the Second World Fishing Boat Congress had been held during the biennium with successful results.

216. The Conference requested the Director-General to examine the methods being used in the production of the World Fishery Abstracts, especially with respect to its relation with other publications, and with due regard for the audience for which these Abstracts were intended. The Conference, however, suggested that no radical changes should be introduced without consulting with Member Governments.

217. The Conference endorsed the practical field work in fishing gear and methods technology performed during the biennium, and appreciated the initiation of research work in this field, that had already led to valuable results.

218. The Conference noted the initiation of studies on the safety of life at sea, where applicable to fishing craft, with special reference to the question of stability, expressed the hope that this matter would be kept under continuous review, and requested the Director-General to explore the possibility of establishing a standing committee to consider these matters so as to provide criteria for the consideration of Member Governments.

219. The Conference recognized the value of the work being undertaken on the design of fishery research vessels. It was suggested, however, that in order to relieve the pressure on the small staff available for this work, activities accepted by the Organization should be restricted to the organization of expert meetings, the exchange of information and, where specifically required by Member Governments, and as the budget allowed, to design studies to serve as a basis for further work by fishing vessel designers outside FAO, and to advice on plans submitted.

220. The Conference noted with approval the development of recent work on the improvement of traditional methods of fish processing and the development of new fishery products. It also requested the Director-General to look into the possibility, subject to the availability of funds, of organizing a symposium on the Nutritive Value of Fishery Products as a joint activity of the Fisheries and Nutrition Divisions.

221. Fisheries Economics and Statistics: The Conference was gratified with the work carried out in fishery economics, statistics and related fields, endorsed the program proposed, and noted that the work was fundamental to any sustained fishery. It hoped the work would be intensified, especially in regard to fishery institutions and services, cooperatives and statistical methods. The Conference noted the small number of professional staff members engaged in this field and the breadth of the subject matter covered, and hoped that the number of staff allocated to this sector would not fall below the minimum essential to carry on the work.

222. Some delegations hoped that the Fisheries Economics Branch of the Fisheries Division would be strengthened from both the budgetary and personnel points of view, so as to be able to carry out satisfactorily the intensified work mentioned above.

223. The Conference recognized the fundamental importance of economics and statistics as an indispensable basis for the entire work of the Fisheries Division, and that its effective operation required that the biological, technological and economic experts should operate on a coordinated basis to conduct a thoroughly rounded fisheries program. In this context, some delegations stressed the desirability of retaining the Fisheries Statistics in the Fisheries Division, but agreed upon the desirability of maintaining close contact with the Statistics Division.

224. The Conference noted with appreciation the progress reported in the improvement and simplification of fishery statistics, took note of the Report of the Expert Meeting on Fishery Statistics in the North Atlantic area (Edinburgh, 1959), and recommended that this work should be followed up in the terms of the following resolution:

Resolution No. 23/59

FISHERY STATISTICS IN THE NORTH ATLANTIC AREA

THE CONFERENCE:

Notes with satisfaction that the Expert meeting on Fishery Statistics in the North Atlantic Area, organized by FAO, co-sponsored by the International Council for the Exploration of the Sea and the International Commission for the Northwest Atlantic Fisheries, and held in Edinburgh, Scotland, 22-30 September 1959, has agreed on recommendations to governments and international organizations designed to improve and considerably simplify the collection and reporting of fishery statistics in the North Atlantic area,

Accepts the recommendations of the Meeting that FAO should transmit its report to the governments and international organizations concerned with the request

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that they consider implementation of the recommendations contained in it,

Accepts further that FAO should, in due course, publish a fully documented edition of the report,

Welcomes the suggestion of the Meeting for the establishment of a Continuing Working Party on Fishery Statistics in the North Atlantic Area to keep under continuous review the progress made in the implementation of the recommendations of the Meeting, consult with the officers of governments and of international organizations with respect to difficulties encountered and, keeping in mind the actual state of fishery statistical services in the different countries, make suggestions for further national and international action in its field to governments and international organizations as appropriate,

Agrees that the Working Party should consist of one governmental expert each nominated by the Governments of Canada, the Federal Republic of Germany, Iceland and the United Kingdom, one expert each nominated by the Secretary-General of the International Council for the Exploration of the Sea and the Executive Secretary of the International Commission for the Northwest Atlantic Fisheries, one expert nominated by the Director-General of FAO, and such additional experts as may be nominated by the Working Party itself, and

Authorizes and requests the Director-General to establish the Working Party in accordance with Article VI of the Constitution and to arrange, as requested by the Meeting, for the FAO Fisheries Division to function as secretariat for the Working Party.

225. The Conference commended the highly efficient performance of the Fisheries Division in the Yearbook of Fishery Statistics, not only as to its timeliness of issue and technical soundness, but also as to its convenience of format and increasing coverage, all of which were of the greatest value to Member Governments. The Conference noted that the staff producing the Yearbooks was also engaged on other essential activities of the Division, and that the efficiency of their work was enhanced by their close contact with other fishery specialists in the Division.

226. The Conference in endorsing the proposed program of work on fishery economics, statistics and related fields, specially referred to the proposal to hold a technical meeting on financial assistance to fishery industries, in order that administrators of credit and subsidy schemes in Member Countries should have an opportunity of exchanging experience and of reviewing methods of handling such matters.

227. The Conference endorsed a recommendation of the Fourth FAO Regional Conference for Asia and the Far East for holding, under the Expanded Technical Assistance Program, a Seminar in Fish Marketing in the Indo-Pacific Region at the invitation of Malaya, as soon as funds permitted.

228. Activities in the Regions: The Conference approved the Report of the Indo-Pacific Fisheries Council (IPFC) on its work in 1958/59 (C 59/FI/2) and endorsed the program of the IPFC for the next biennium subject to the availability of funds. It recognized that the subject matters to which the IPFC had directed its attention had a great deal in common with those that fell within the responsibility of the outposted fishery officers in the region, and that the staff of the Fisheries Division, in servicing the Council, were thereby enabled to carry out more effectively the Organizations fisheries program in the region.

229. Some delegates from the Indo-Pacific region asked that the attention of the Director-General be drawn to the need for assisting Member Governments in strengthening fishery administrations and research services, in order to develop a sound institutional and scientific basis for the development of the fisheries in the region.

230. The Conference approved the Report of the General Fisheries Council for the Mediterranean (GFCM) on its work in 1958/59 (C 59/FI/3), and endorsed the program of the GFCM for the next biennium.

231. The Conference noted the growing volume of the work in the Regional Fishery Office for Europe and the Middle East, due not only to normal representational work in the region, but also to the growing output of the General Fisheries Council for the Mediterranean, and to the formation of the European Inland Fishery Advisory Commission. The Conference therefore approved the Director-General's proposal to strengthen the staff of this office by the appointment of an additional Regional Fishery Officer to be stationed in Cairo; this appointment had originally been recommended by the 4th FAO Near-East Regional Conference, Damascus, 1958.

232. The Conference requested the Director-General to explore the possibility of setting up a fisheries consultative body for the Near East.

233. The Conference noted with approval that effect had been given to the decision at the 9th Session of the Conference to form the European Inland Fisheries Advisory Commission. Fourteen countries had already indicated their interest in taking part in the work of the Commission, which would hold its first meeting in Dublin in April 1960, at the invitation of the Government of the Republic of Ireland.

234. The Conference noted that the post of Regional Fishery Officer in Africa authorized by the Ninth Session of the Conference had been filled. Delegates from West African countries expressed their interest in the establishment of a regional fisheries consultative body in West Africa, and in the following resolution, which it adopted, the Conference requested the Director-General to explore this possibility:

International (Contd.):

Resolution No. 24/59

REGIONAL FISHERY CONSULTATIVE BODY WEST AFRICA

THE CONFERENCE:

Considering that the States and Territories of the West African Region members of FAO are desirous of developing the fisheries of that area,

Noting that these States and Territories have many common problems connected with such development and that they wish to co-operate amongst themselves in planning and carrying out work that will forward such development and also to exchange fisheries information in order to keep abreast of new knowledge, and

Noting further how successful the Indo-Pacific Fisheries Council and the General Fisheries Council for the Mediterranean have been in developing fisheries in the Indo-Pacific and the Mediterranean areas respectively,

Requests the Director-General to explore the possibility of establishing a body in the western part of the African Region to serve that area in a manner similar to that in which the IPFC and the GFCM serve their areas.

235. The Conference noted that the outposted fishery staff in the Latin American Region, as authorized at the Ninth Session of the Conference, had been strengthened by the appointment of a Regional Fishery Officer at Rio de Janeiro.

236. The Conference noted that only two notifications of acceptance of the draft agreement for the establishment of a Latin American Fisheries Council had so far been deposited. This matter is reported further in paragraphs 632-633 of this Report.

237. The Conference now took the view that in Latin America smaller groups of States might more readily find matters of common interest in the field of fisheries, in contrast to the wide scope of the earlier proposal for a Latin American Fisheries Council, which had been open to all the States in Latin America. The Conference, in this context, adopted the following Resolution introduced by Argentina on behalf of the Delegations of Argentina, Brazil and Uruguay:

Resolution No. 25/59

REGIONAL FISHERIES CONSULTATIVE BODY WESTERN SOUTH ATLANTIC

THE CONFERENCE:

Considering that Agreement for the establishment of the Latin American Fisheries Council has not been ratified by the necessary number of countries to enable the Council to come into being,

Observing that the American States of the South Atlantic (Argentina, Brazil, and Uruguay) have expressed particular interest in co-operating among themselves on common problems in order to promote fuller use of the marine resources in the Western-South Atlantic in accordance with sound economic and scientific principles, to coordinate studies, research and techniques and to determine their common needs,

Recognizing that the general objectives of the proposed Latin American Fisheries Council could best be achieved within a limited area comprising a number of countries which, through their geographical location, have problems in common and which are disposed to coordinate their activities in order to advance the development of their fisheries industries,

Requests the Director-General to study, together with the Governments of the American countries of the South Atlantic concerned, the possibility of:

(a) Creating a Regional Fisheries Commission to serve the said zone in a form similar to that of other FAO Regional Fisheries Councils or Commissions, and

(b) Developing a coordinated project of fisheries technical assistance in the said region and advising the Governments concerned on the best way of implementing the same.

238. Future Trends: As regards future trends, the Conference requested the Director-General to take into account the following suggestions if, at some future time, additional funds should become available.

239. Greater emphasis should be placed on the institutional and structural aspects of fisheries generally.

240. Work should be intensified in the fields of fish marketing and distribution, fishery co-operatives; and, in particular, detailed study should be made of productivity in marine and inland fisheries and of the problem, of the protection and conservation of marine fishery resources.

241. Work on the appraisal of fishery resources should be intensified and the problems of exploitation examined from the biological, economic, and technological points of view.

242. A series of forecasts by continents of the trends of output over the ensuing ten years should be undertaken, if possible.

243. The Conference noted the opportunities which were available to Member Governments for contributing to freedom from hunger by promoting increased consumption and production of fish and fish products; it stressed the increasing signifi-

International (Contd.):

cance of the fisheries in those parts of the world which still suffered from malnutrition, especially for those people whose diets lacked high quality protein. It suggested, therefore, that within the general work of FAO to promote freedom from hunger, considerable attention should be paid to fisheries.

--By Sidney Shapiro, Chief, Branch of Special Reports, Division of Industrial Research and Services, U. S. Bureau of Commercial Fisheries, Washington, D. C.

Note: Also see Commercial Fisheries Review, February 1958, p. 52.

GENERAL AGREEMENT ON TARIFFS AND TRADE

FIFTEENTH SESSION OF THE CONTRACTING PARTIES:

The Fifteenth Session of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT), held at Tokyo, ended November 20, 1959. Representatives of the 37-nation trade agreement group achieved further progress in removing barriers to world trade.

Balance-of-Payments Import Restrictions: A drive to eliminate discrimination against American and other dollar area exports was the highlight of the Session. The urgency of moves in this direction was touched off by the strong declaration of the United States at the opening Ministerial Meeting. The restoration of external convertibility to the main trading currencies of the world has removed any balance-of-payments justification for discriminatory restrictions by countries whose export earnings are largely in convertible currencies.

The drive to eliminate discrimination was greatly aided by the International Monetary Fund's decision of October 23 calling for removal of discriminatory restrictions with all feasible speed. This decision, which was made available to the Contracting Parties at the Session's opening, supported the strong statements against discrimination and restrictions made by the United States and other ministerial level speakers.

The Contracting Parties adopted a report which concluded that discrimination in trade on balance-of-payments grounds should quickly be ended. It indicated that the justification for such discrimination had been almost completely eliminated by convertibility of currencies.

The United States and many other countries also stressed the need to reduce the use of all import quotas by countries emerging from balance-of-payments difficulties.

Several countries took important steps to relax their trade controls and reduce discrimination during the Session. Among them were the United Kingdom, France, Japan, Sweden, and the Netherlands.

Other countries (including Australia, New Zealand, Malaya, Rhodesia and Ghana) were able to point to recent measures of a similar character.

Previously scheduled balance-of-payments consultations were held with six contracting parties: Australia, Japan, the Federation of Malaya, Norway, the Federation of Rhodesia and Nyasaland, and Sweden.

Expansion of International Trade: Three committees on the expansion of international trade, which have been meeting during the intersessional period, met again during the Session.

Committee I, on tariff reductions, submitted final recommendations setting forth the rules and procedures to be followed in the tariff conference to be held in Geneva in 1960-61. This conference will be divided into two phases: (1) The principal emphasis in the first phase (September through December 1960) is to be on tariff negotiations and renegotiations incident to the formation of the European Economic Community. (2) The second phase, beginning in January 1961, is to be devoted to an exchange of new concessions among contracting parties and to negotiations with countries acceding to the GATT.

Committee II conducted its second round of country-by-country consultations on agricultural policies. The consulting countries were Burma, Ceylon, Malaya, Indonesia, and Rhodesia and Nyasaland. During the coming year there will be further rounds of consultations, at the end of which the Committee will report on the effects of agricultural protection upon international trade. The presentation of United States agricultural policy is scheduled for February 1960. (Fishery policies will be included with agricultural policies in some instances.)

Committee III is seeking ways of expanding the export earnings of the less developed countries as a means of accelerating their development and making them less dependent upon foreign aid. In a preliminary report, the Committee identified some of the obstacles to increased trade encountered by the less developed countries in foreign markets. These obstacles include high revenue duties, preferential arrangements, import quotas, and restrictive state trading, in addition to high tariffs. The Contracting Parties approved the Committee's recommendation that individual governments examine such measures of theirs as may impede the trade of less developed countries.

Avoidance of Market Disruption: During the discussions at the ministerial level the United States drew attention to the fact that sharp increases in imports, over a brief period of time and in a narrow range of commodities, can have serious economic, political, and social repercussions in the importing countries. He pointed out that the problem is to find the means to ameliorate the adverse effects of an abrupt invasion of established markets while continuing to provide steadily enlarged opportunities for trade. The subsequent discussions made it evident that the apprehension that such situations might arise had led some countries to maintain or impose import restrictions against particular imports from some countries.

The question was discussed in Plenary Session and it was agreed that, in view of the complex nature of the problem, the question should be deferred until the Sixteenth Session. Meanwhile, the Executive Secretary will prepare a factual report for the Contracting Parties. At the Sixteenth Session the Contracting Parties can consider whether to establish a panel of experts to examine the problem or whether some other method of approach is likely to be more appropriate.

Regional Market Arrangements: The Contracting Parties received reports on three movements toward regional economic integration.

The Swedish ministerial representative reported on the negotiations for a European Free Trade Association (EFTA) which Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom--the so-called Outer Seven--are negotiating. He said that the EFTA countries would continue to be bound by their GATT obligations in carrying out arrangements for progressive abolition of tariffs and quota restrictions on trade among the member countries. The first step in this process is to take place on July 1, 1960. He assured the Contracting Parties that EFTA does not intend to use quantitative restrictions in order to create a preferential trading system.

Delegates to Brazil, Chile, Peru, and Uruguay and observers for Argentina and Bolivia spoke about the plans of these countries to establish a free trade area. They referred to the draft treaty prepared at Montevideo last September, which is to take final form in February 1960. The delegates pointed out that the proposed free trade area was intended to increase trade and help raise living standards, and that improvement in economic conditions in Latin America would lead to increased trade with other countries.

A spokesman for the Commission of the European Economic Community (EEC) or "Common Market" gave the Contracting Parties an account of the progress of the EEC during 1959. He noted that the provisions of the Rome

International (Contd.):

Treaty regarding reduction of customs duties and relaxation of quota restrictions in intra-EEC trade had been carried out on schedule, and that many tariff reductions had also been extended to the products of outside countries. He stated that the Commission hopes to submit proposals on agricultural and fishing policy to the EEC Council of Ministers before the end of 1959. He said that the EEC draft external tariff was receiving urgent attention, so that it would be ready in ample time to allow for preparation for the 1960-61 tariff conference. The representative spoke of the EEC's interest in helping countries in the process of economic development.

Other Items: Specific commodity problems were pursued bilaterally and informally by the United States Delegation at the Fifteenth Session with a number of other delegations, including those of Japan, France, Italy, the Federal Republic of Germany, Norway, Australia, Belgium, the Netherlands, and the Federation of Rhodesia and Nyasaland. The conversations are expected to result in the relaxation of some import restrictions on certain United States products in the very near future.

INTERNATIONAL OCEANOGRAPHIC CONGRESS

FISH BEHAVIOR STUDIES COULD INCREASE YIELD:

A school or "congregation" of cod is a social organization with one dominant male and a whole hierarchy of inferior or less aggressive males set in an established scale, according to Dr. H. O. Bull of England, who reported to the International Oceanographic Congress at the United Nations, New York City, in September 1959. "Each male defends his chosen territory against invasion by other males but females can wander freely throughout the social order," he said. At spawning time, each female is pursued in a courtship dance with a male that may last for fifteen minutes before the eggs are laid and fertilized.

"Such studies of the psychology and social behavior of the commercial food fishes are essential if the fish harvest is to be increased," said Dr. Bull of the Dove Marine Laboratory where he has been studying cod in a tank 20 feet long, 5 feet deep, and 5 feet wide. The grunting noises made by the male during courtship, for instance, can be clearly picked up by microphones and could be used to locate schools of cod. Dr. Bull recommended that ocean fish be studied by close observation of their behavior in aquariums to lay the basis of more successful large-scale fisheries.

"There are three things that make an ocean fish suffer: light, temperature, and too little salt in his bath. All three increase his rate of respiration and his heartbeat," reported Professor H. H. Friedrich, Institute for Marine Research at Bremerhaven in Germany, to the Oceanographic Congress. The fish cannot stand the combination of bright light in warm water and either get away or succumb. Tropical fish stay away from the surface for this reason and most fish seek the cooler and darker waters well below the surface.

Dr. Friedrich said that, on the other hand, the habits of many ocean fish are related to the phases of the moon so that they seem to be sensitive even to faint light. Echo-sounding devices that are used by trawlers to measure the depth of the water and to locate schools of fish by their echoes do not bother the fish. They seem not to notice them, but when sounds are used as signals for feeding time, the fish do respond to them.

Dr. N. K. Panikkar, Chief of the Fisheries Development Office in New Delhi, India, chairman of one of the meetings at the Oceanographic Congress, cited research on fish behavior as of prime importance to any country that depends on seafood for part of its food supply. In India there are usually large catches of sardines, mackerel, and shrimp, but the fish population fluctuates widely. In one year, 200,000 metric tons of sardines are caught while in the next year there may be almost none. The reasons are unknown. The psychology of fish behavior and habits needs international research.

Professor Trygve Braarud of the Institute for Marine Biology of Oslo University, Norway, reported on the production of plants in the ocean, but plants so small that they are like grains of dust. The amount of production of these microscopic plants is at least equal to the production of all the land plants put together. He said that these plants--phytoplankton--contain many valuable minerals and vitamins and even antibiotics and that the explanation of fish aggregation may be partially due to the prevalence of these organisms. "There exists in the sea," he said, "areas like land deserts which can be explained by this phenomenon." He called for further research in this field as a possible food resource for men, land animals, and fish.

International (Contd.):

INTERNATIONAL PACIFIC HALIBUT COMMISSION

EFFECTS OF FISHING EFFORT VERSUS CLIMATIC CHANGES ON FISH STOCKS EVALUATED:

The controllable effects of fishing should be compared with the uncontrollable forces of nature in studying the effects of climatic-temperature changes. This is the advice to fishery managements given in a report on the commercial yields of Pacific, Atlantic, and North Sea fisheries to the Fisheries Research Board of Canada by F. Heward Bell and Alonzo I. Pruter of the International Pacific Halibut Commission. Their report points out that in their opinion inadequate provision has been made in some instances for changes in the amount of fishing, in economic conditions, or in the efficiency of the fishing fleets.

Halibut

"It has been usually believed that abundance has been little affected by fishing, natural fluctuations appearing to transcend by far the effects of man. However, lately this belief is being challenged. Hodgson, supported by Cushing and Burd (1957), provides some evidence that fishing has reduced the size of herring stocks. . . . For some demersal species, particularly the flatfish such as the Pacific halibut, sole, or brill the stocks seem to have been more responsive to fishing than to natural fluctuations."

Determination of stock sizes and their maximum utilization cannot be adequately resolved until fishing versus environmentally-induced changes in fish populations are each placed in their proper perspective, say the authors.

Regarding the possible effects of air and water temperatures on fish stocks, the report points out that on the north Icelandic offshore coastal area there is a long-term resemblance between sea-surface temperature and air temperature, but over short terms of 10 to 20 years the trends may be very dissimilar and frequently in opposite directions.

Extremely cold or unusually warm air temperatures during one month or over a limited period of the year were unlikely to be immediately reflected in midwater or bottom temperatures in the oceanic regions where halibut spawn, and where the eggs and larvae appear to spend their early existence.

Even within a restricted coastal area, such as that of North Iceland, long-term sea-surface temperature trends in some months may be very different between locations in close proximity.

In the examination of fishery statistics bearing on these matters, the authors suggest that wherever possible catch per unit of effort values should be used rather than production (landing) values.

They declare that the current belief, that the yield or size of stocks of demersal fish in the Barents Sea have been mainly influenced by long-term climatic changes, must be re-examined.

"Fishing in such distant waters, particularly Greenland, has been made possible due to the technological developments of the past 30 to 40 years. Mechanical refrigeration, oil rather than coal for generating steam, dieselization, depth finders, electronic positioning, and many other navigational devices, all have aided in the profitable expansion of the range of fisheries.

"The warming of the waters may have played a far less important role than is generally accepted in affecting the pattern of stock changes and of annual yields. Also, while it is true that warming of the seas could increase productivity through enhanced growth, increased recruitment or migration of adults, it is also true that the more clement weather would facilitate fishing."

Stressing the need for caution in judging the past, present, and the future productivity of the Pacific and Atlantic cod, the authors consider that some coincidence between climate and yields should not be allowed to militate against a balanced understanding of the manifold forces affecting the fisheries.

On conditions in Faroe and Iceland they quote A. D. McIntyre, of the Scottish Home Department, who reported in 1952 on an extensive analysis of the Scottish trawl and line catches of halibut from various North Atlantic areas for the years 1930 to 1949.

"McIntyre observed that on the Faroe grounds the Scottish trawl catch per unit of effort had declined in 1942 and 1943 from the higher 1940 and 1941 level in spite of the relatively low wartime fishing intensity by Aberdeen vessels, and it was concluded that the higher 1940-1941 level could be projected back to good brood years of 1937 and 1938.

"The 1940-41 high trawl catch per unit of effort could also be projected forward to a higher Scottish liner catch per unit of effort in 1943 and 1944 from older fish of the same year-classes. A similar situation was observed on the Iceland grounds for Scottish vessels, except that the projection into the liner catch per unit of effort was not apparent until 1945-1946."

McIntyre, the report goes on, used only the fishing intensity and yields of the Aberdeen fleets in judging the effects of fishing upon the several stocks. "The Aberdeen fleet's Icelandic production varied from 4 to 45 percent of the annual total by all countries during the period of study, 1930-1949, not including the war years.

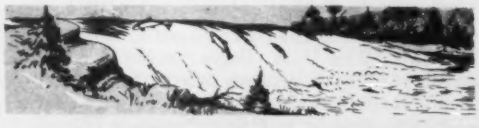
"The data presented by McIntyre should not be considered indicative of the total forces to which these stocks have been exposed. It would be the changes in the total amount of fishing and the combined catches by vessels of all nations to which the stocks would be responsive."

The authors conclude, on the available evidence, that the effects of man's removals on the stocks appear to transcend any long-term effects that natural fluctuations may have had. They add: "The hypothesis that fishing, not natural forces, has been the major factor affecting the stocks appears well founded." (The Fishing News, October 16, 1959.)

INTERNATIONAL PACIFIC SALMON COMMISSION

FRASER RIVER SOCKEYE FISHERY, 1959:

The 1959 Fraser River sockeye catch of 3,390,000 fish was 46 percent greater than the catch in any previous cycle-year in 56 years, according to the International Pacific Salmon Fisheries Commission. Also the escapement of 970,000 fish was up almost 300 percent over that of the previous cycle-year in 1955 and considerably greater than that recorded previ-



International (Contd.):

ously for any other year of that four-year cycle.

The record Fraser sockeye run in 1959 was a continued demonstration that the Fraser River sockeye runs are rapidly being restored to the abundant numbers prevailing prior to the slide at Hell's Gate Canyon in 1913. The Hell's Gate fishways combined with scientifically-designed fishing regulations and a fundamental research program are now proving their worth in millions of dollars of increased income to Puget Sound and Fraser River fishermen.

In the 1958 cycle-year the Fraser River produced a total run of 19 million sockeye. This was the largest run on that cycle-year in the 85-year history of the commercial fishery and the largest run of any year since the famous run was almost destroyed by the Hell's Gate slide in 1913. By 1918 the cycle-year pack had declined to 70,000 cases, but in 1958 the cycle pack was 1,223,000 cases worth $49 million, an increase of $46 million in value as compared with 1918.

The International Pacific Salmon Fisheries Commission was established by a Convention between the United States and Canada in 1937 to rehabilitate the Fraser River sockeye fishery and to manage the fishery after eight years of research to the end that the fishery would be preserved and the allowable catch divided equally between Canadian and United States fishermen. In 1957 the Convention was amended to place Fraser River pink salmon under similar jurisdiction by the Commission.

MARINE OILS

INCREASE IN 1960 FORECAST FOR WORLD PRODUCTION AND EXPORTS:

World production of marine oils (includes whale and sperm whale oils and fish and fish-liver oils) will be up about 2.9 percent and world exports will be up about 6.2 percent in 1960 as compared to 1959. The U. S. Department of Agriculture's Agricultural Marketing Service in its November 1959 issue of The Fats and Oils Situation (1960 Outlook Issue) forecasts that world production of marine oils will be 1,050,000 short tons as compared with 1,020,000 tons in 1959. The forecast for world exports of marine oils in 1960 is 775,000 tons as compared with 735,000 tons in 1959.

Table 1 - Estimated World Production and Exports of Marine Oils[1/] (Averages 1935-39 and 1950-54, Annual 1955-60)

Marine Oils	1960[2/]	1959[3/]	1958	1957	1956	1955	Average 1950-54	Average 1935-39
	(1,000 Short Tons)							
World production	1,050	1,020	1,030	1,025	1,110	1,060	990	1,055
World exports	775	730	760	730	745	725	694	710

1/Includes whale and sperm whale oils and fish and fish-liver oils.
2/Forecast.
3/Partly forecast.

MARINE RESOURCES SURVEY OF SOUTHEAST ASIAN AREA

The Scripps Institution of Oceanography (La Jolla, Calif.) research ship Stranger is now in the Southeast Asian area for a two-year survey of marine resources of the South China Sea and Gulf of Thailand. The work is supported by an International Cooperation Administration grant.

The survey work of the ship is planned in conjunction with a Regional Training Course in Marine Sciences at Nhatrang, South Viet-Nam, sponsored by the Republic of Viet-Nam and the United Nations Educational, Scientific, and Cultural Organization Science Cooperation Office for South-East Asia. Practical experience will be offered to the participants in the course on board the Stranger.

NORTHWEST ATLANTIC FISHERIES COMMISSION

TENTH ANNUAL MEETING:

Following an invitation from Norway, the Tenth Annual Meeting of the International Commission for the Northwest Atlantic Fisheries will meet in Bergen the week of May 30, 1960. The Annual Meeting will be preceded by meetings of the Standing Committee on Research and Statistics and of groups of advisers to panels on May 24-28.

* * * * *

MORE COUNTRIES FISH IN NORTHWEST ATLANTIC:

To the countries which have begun fisheries in the Convention Area during re-

International (Contd.):

cent years is now to be added East Germany. Trawlers with Rostock on the Baltic as their home port in 1959 landed several cargoes, mainly redfish or ocean perch and cod, from the Labrador-Grand Bank area. It is expected that this fishery will increase in the near future.

Reports from Vigo, Spain, indicate that the Spanish trawl fishery in the Grand Bank area in 1959 yielded better results than in 1958.

In 1959 trawlers from Poland began fishing in the Northwest Atlantic (Labrador region) for redfish or ocean perch. The report from the fishery states that excellent results were obtained.

SOUTH PACIFIC COMMISSION ON MARITIME RESOURCES

SIXTH MEETING HELD IN QUITO:

The Sixth Ordinary Meeting of the Permanent Commission on Maritime Resources of the South Pacific and the Second Meeting of the Commission's Scientific Advisory Committee were held in Quito from November 12-19, 1959, with delegates from Chile, Peru, and Ecuador in attendance. Addressing the inaugural session of the Commission, Chile's Ambassador to Ecuador praised the progress attained in the scientific investigation of the fish and whale industries, "proving what can be done with international cooperation." "It is the hour for abandoning outdated conceptions of isolation and for entering an era of interdependence," the President of the Ecuadoran delegation added.

Reports of the three delegations indicated considerable cooperative study of the problems of exploitation and conservation of marine resources. Ecuador reported establishment of a library of scientific and technical publications for use of the Commission and establishment of a National Fisheries Institute. The Scientific Advisory Committee recommended the acquisition of a special laboratory vessel for the Commission's investigation of whales, and the preparation of a dictionary of scientific terms in the fishing industry. In the closing session the Commission elected Dr. Galo Leoro Franco, of Ecuador's Foreign Ministry, as its permanent Secretary General.

Note: See Commercial Fisheries Review, October 1957, p. 23.

TUNA

SOUTHERN EUROPEAN COUNTRIES BUILD NEW TUNA FISHING VESSELS:

Several southern European countries are building tuna vessels. In addition to six tuna clippers under construction in Genova, Italy, Portugal is also building six tuna vessels. At present Portugal is operating two large tuna vessels.

Both Italy and Portugal will fish for tuna in the Atlantic Ocean. France, too, is pushing construction plans for tuna vessels. At Dakar, French West Africa, about 9,000 tons of tuna were landed during the first quarter of 1959. Five Dakar packing plants used about half of the landings and the remainder was shipped to France. (Suisan Tsushin, November 19, 1959.)

UNITED NATIONS

SECOND CONFERENCE ON THE LAW OF THE SEA TO OPEN ON MARCH 17, 1960:

The Second United Nations Conference on the Law of the Sea will convene in Geneva, Switzerland, on March 17, 1960. It is hoped that the task of the Conference will be completed by April 14, 1960. Should it prove impossible for the Conference to finish its work within that four-week period, arrangements can be made to enable the Conference to continue through the following week, April 19-22, 1960.

Preparations for the Conference are being made by the United Nations Secretariat, which expects to circulate to the invited Governments, specialized agencies, and intergovernmental bodies a draft agenda and draft rules of procedure for the Conference, as well as certain recommendations concerning the method of work and procedures, and other questions of an administrative nature.

Attention is drawn to the terms of paragraph 3 of the resolution which invites all states members of the United

International (Contd.):

Nations and states members of the specialized agencies to include among their representatives experts competent in the matters to be considered.

Note: Also see Commercial Fisheries Review, February 1959, p. 49.

WHALING

COUNTRY QUOTAS FOR 1959/60 ANTARCTIC SEASON:

The Norwegian Government has approved a recommendation from the Norwegian Whaling Council that Norway's quota for the 1959/60 Antarctic whaling season shall be limited to 5,800 blue-whale units. (One blue whale equals 2 fin, 1½ humpback, and 6 sei whales.) Altogether 8 Norwegian expeditions, one less than last season, are participating in Antarctic whaling. They are using a total of 77 catcher vessels as compared with 100 during 1958/59, including 7 vessels operating out of the Norwegian land station at Husvik Harbor. The factory-ship Suderøy and its 6 catcher vessels, which took part in last season's whaling, have been bought by the Norwegian Whaling Association and will not participate. Norwegian expeditions and the Husvik land station vessels will have a combined complement of 4,210 men, or 497 fewer than in the 1958/59 season. Another 1,975 Norwegian whalers will be working for British and Argentine companies.

Also engaged in the Antarctic whaling this coming season are expeditions from four other countries, including 6 Japanese, 3 British, 2 Russian, and 1 Dutch, plus two land stations--1 British and 1 Argentine, using a total of 158 catcher vessels. There will thus be altogether 20 expeditions, same as last season, assisted by 235 catcher vessels, as against 256 in 1958/59. While Norway has withdrawn the 11,000-ton Suderøy, the Soviet Union is sending its new 40,000-ton Sovietskaya Ukraina, accompanied by 20 catcher vessels.

At a conference in London nearly a year ago, the five major whaling nations reached tentative agreement that the Soviet Union should be allocated 20 percent of the international quota for a period of 7 years. On the basis of a maximum catch equivalent to 15,000 blue-whale units, the Soviet Union should thus be entitled to 3,000 units. At subsequent conferences, Norway, Great Britain, Japan, and the Netherlands failed to work out agreement on distribution of the remaining 80 percent of the whaling quota. In view of this development, Norway withdrew from the International Whaling Convention as of July 1, 1959, and the Netherlands later followed suit. Thus, the International Whaling Convention now includes only three nations--Great Britain, Japan, and the Soviet Union.

Norway for many years has been a strong advocate of measures to preserve the Antarctic whale stock. When efforts for aggreement failed the Norwegian Whaling Council urged a national quota of 5,800 units, to yield approximately the same catch as last season. The quota for the Japanese expeditions has officially been fixed at 5,036 units. The British quota, though not officially announced, is known to be 2,500 units. And the Dutch company operating the Willem Barends expedition plans to catch the equivalent of 1,200 units. If the Soviet expeditions stay within the approved 3,000 units, the combined national quotas would total 17,500 units. The over-all quota set by the 18-member International Whaling Commission for 1959/60 would thus be exceeded by at least 2,500 units.

Marine biologists are of the opinion that to preserve the Antarctic whale stock the maximum quota for all nations should be limited to 10,000-11,000 blue-whale units. Protection of the blue-whale stock, they maintain, is especially important. According to a statistical survey, published in the last issue of Norsk Hvalfangst-Tidende (Norwegian Whaling Journal), the number of blue whales caught in the Antarctic during 1958/59 constituted only 4.4 percent of the total catch, as against 84.2 percent during the 1931/32 season.

The International Whaling Commission in 1959 decided to let the Antarctic fin and sei whale hunt start on December 28, one week earlier than in former years. For blue and humpback whales the opening dates were set at February 1 and Jan-

International (Contd.):

uary 20, respectively. The entire season could thus last 102 days, extending to April 7, 1960. Land stations, whose vessels catch only sperm whales, are not covered by the quota arrangement. From October 1 to April 1 they can catch an unlimited quantity. (News of Norway, November 26, 1959.)

Note: Also see Commercial Fisheries Review, December 1959, p. 93 and January 1960, p. 80.

WORLD FISHERIES

LANDINGS INCREASED THREE MILLION TONS IN 1958:

The world's total commercial fisheries landings in 1958 increased 3 million metric tons over 1957, according to the Yearbook of Fishery Statistics, vol. IX, released by the Food and Agriculture Organization of the United Nations. Japan, with a catch of 5.5 million tons, continued to be the largest producer of marine fishery products.

The Yearbook, published jointly with a yearbook on statistics on international trade in fish, covers the catch of fish from 1953 to 1958. The total 1958 catch was 33.7 million tons live weight, almost 13 million tons more than in 1938 or 1948, just before and after World War II. Russia reported the highest catch in her history, at 2.6 million tons. The 1958 total includes a rough estimate of six million tons for production of sea and fresh-water fish by Mainland China. This figure has been released by the Government of that country and represents a 100-percent increase over its reported catch in 1957.

Asia had 50 percent of the world's total catch. Japan contributed 17.2 percent of the Asian total. European fishermen, excluding those from Russia, caught more than 22 percent, and North Americans about 10 percent. The U.S.S.R. reported catches amounting to more than 8 percent of the world total. Africa contributed 5 percent, an outstanding increase over last year.

Seven countries each caught more than one million tons in 1958 and accounted for almost 60 percent of the world total. Japan's 1958 catch reached a level she had hoped to realize by 1960. The United States, Mainland China, and the U.S.S.R. each caught between 2 and 3 million tons of sea fish in 1958. Canada, Norway, the United Kingdom, and India each produced about one million tons. Korea, one of the great prewar producers with a catch of 1.8 million tons in 1938, produced less than 500,000 tons.

Herring, menhaden, sardines, and anchovies were the most important group of fish, accounting for 20 percent of the world catch. Sixteen percent were fresh-water fish, more than double the amount caught before World War II. Cod, hake, and haddock accounted for more than 13 percent of the total. In most groups catches were above prewar level. However, this still was not the case for salmon, trout, and smelt, which are commercially important though not a very large group in quantity. About one-half the 1958 total catch was marketed fresh or frozen; about one-quarter was cured by drying, smoking, salting, or marinating; about 14 percent was used to make fish meal and oil; 9 percent was canned; and the small remainder was used for other purposes.

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TRADE IN 1957 EXCEEDED ONE BILLION DOLLARS:

International trade in fish in 1957 went over the US$1 billion mark, according to the FAO Yearbook of Fishery Statistics, vol. VIII. The Yearbook, published jointly with a volume on the actual landings of fish, is the first on international trade (fish exports and imports) published since 1953. It covers the years 1953-57, with 1948 given as comparison.

Trade is broken down into frozen, dried and salted fish, smoked and canned fish products, and fish oils and meals. There was a sharp upswing in the fish-meal industry. Exports of fish meal, which is used primarily for animal feeding, have increased from $13 million in 1948 to $80 million in 1957. Major exporters of fish meal, who have taken the lead due to the expansion of the fish-meal industry in their countries, are Angola, the Union of South Africa and South-West Africa, Canada, Peru, Denmark, and Norway.

Major markets for fish meal include the United States, whose imports increased from $4.6 million in 1948 to $9.5 million in 1957, and the United Kingdom whose imports went from $3 million in 1948 to $24 million in 1957. Western Germany increased her imports of fish meal from $300,000 in 1948 to $20 million in 1957.

Exports of fresh and frozen fish went up 150,000 metric tons from 1953 through 1956. The greater position of this trade was in filleted fish rather than whole fish, reflecting the growth of the frozen fish fillet industry. In dollars, it increased by nearly 50 percent, from $170 million to $232 million. In Africa leading exporters of fish were Angola with a $17 million trade, Morocco with $26 million, and the Union of South Africa with $37 million. Canada led North America with a $136 million export volume. The United States exported only $32 million, but imported $270 million worth of fish--one quarter of the world total.

In South America, Peru did a $20-million export business. Asia was led by Japan with an export of $145 million. Thailand was second with $33 million. Norway topped European fish exporters with $164 million worth, followed by Iceland with $55 million, Denmark with $43 million, the Netherlands with $32 million, and Portugal with $37 million.

Salted cod exports and production have both expanded by 40 percent since 1948. Leading exporters were Canada, Denmark, France, Iceland, and Norway. Chief importers of dried cod were Cuba, Jamaica, Puerto Rico, Brazil, Greece, Italy, Portugal, and Spain.

Although production had been maintained in salted herring and sardines, there was a 20-percent drop in exports since 1948. Eastern Europe was the major importer of salted herring and sardines. Chief exporters are Canada, Iceland, the Netherlands, Norway, Sweden, and the United Kingdom.

The canned fish industry exported $265 million worth. Of that total, 20 percent was Pacific salmon; 40 percent canned herring, sardines, and anchovies; 20 percent tuna and bonito; 10 percent shrimp, lobsters, and oysters; and 10 percent miscellaneous products.

Argentina

JAPANESE FREEZERSHIP TO OPERATE FROM ARGENTINE PORT:

The Japanese tuna freezer-fishing vessel Yoshino Maru arrived at the Argentine port of Mar del Plata on November 16, 1959, with 150 metric tons of tuna. The vessel left Japan on August 26 and fished for tuna en route to Argentina. After leaving Japan, the vessel fished in the Pacific along the equator and caught 70 tons of yellowfin, bluefin, albacore, and big-eyed tuna.

Heretofore it was believed that there were no tuna off the Argentine coast, but

Argentina (Contd.):

the vessel found them 300-500 miles offshore in the Atlantic. The modern Japanese flag vessel is 180 feet long, has a beam of 29.5 feet, and is powered with a heavy-duty 1,150-hp. Diesel engine. The hold capacity is about 440 metric tons of frozen fish and freezing capacity is 17 tons daily. Equipped with all modern navigation aids, the vessel can cruise at 11.5 knots. She is manned by 8 officers and a crew of 50.

The Japanese vessel is under contract to a Mar del Plata fishing firm which plans to use the vessel to obtain frozen fish for the Argentine market. Following the unloading of the tuna caught en route to Argentina, the vessel was scheduled to sail early in December for its first trip from Argentina of about 50 days.

The Yoshino Maru is the second Japanese vessel fishing under contract to the Argentine fishing industry. The first vessel, the Eisei Maru (landed first trip December 17, 1958), has been tuna fishing for about one year for the Mar del Plata Fishing Canning Association. Due to the lack of credit facilities, it would be difficult for the Argentine fishing industry to build and finance vessels of the Japanese type. (The United States Embassy in Buenos Aires, November 17, 1959.)

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LANDINGS OF FISH AND SHELLFISH:

Marine landings of fish and shellfish in Argentina amounted to 71,655 metric tons in 1958, just 69 tons less than the 71,724.3 tons reported in 1957.

The principal marine species of fish caught in Argentina during 1958 and 1957

Table 1 - Argentine Marine Landings of Fish and Shellfish by Fishery Zones, January-March 1958-59 and Annual Totals 1957-58

Zone	January-March		12 Months	12 Months
	1959	1958	1958	1957
	(Metric Tons)			
Fish:				
High seas	7,973.6	5,485.8	25,185.6	25,248.6
Coastal Zones:				
Bahia Blanca	307.6	299.3	1,504.6	1,338.3
Quequen, Necochea	1,189.0	1,657.2	3,665.5	4,616.6
Mar del Plata	7,841.8	11,954.9	36,699.5	34,814.4
Rawson	60.0	200.2	235.9	254.5
San Antonio Oeste	14.2	6.8	59.1	89.0
San Blas, Patagonia	48.6	11.3	42.3	78.3
Tres Arroyos	0.5	-	36.5	187.1
Ushuaia	0.1	-	1.6	-
All other zones 1/	49.6	50.9	130.6	93.5
Total Fish	17,485.0	19,666.4	67,561.2	66,720.3
Shellfish:				
High seas	156.3	205.2	421.4	388.6
Coastal Zones:				
Bahia Blanca	140.7	131.6	459.3	386.8
Quequen, Necochea	625.6	348.9	1,724.3	2,811.3
Mar del Plata	49.5	50.3	468.9	149.9
Rawson	17.0	118.9	765.6	1,015.0
San Antonio Oeste	121.5	118.6	179.8	190.1
San Blas, Patagonia	-	-	1.0	-
Tres Arroyos	-	-	-	-
Ushuaia	0.3	3.3	58.0	52.8
All other zones 1/	3.4	1.3	15.5	9.5
Total Shellfish	1,114.3	978.1	4,093.8	5,004.0
Grand Total	18,599.3	20,644.5	71,655.0	71,724.3

1/Includes Comodoro Rivadavia, Gral. Madariaga, Puerto Madryn, Puerto Deseado, Rio Gallegos, Rio Grande, San Julian, and Santa Cruz.

Source: Direccion General de Pesca y Conservacion de la Fauna, Argentine Government.

Argentina (Contd.):

were hake--27,822 and 25,529 metric tons, respectively. Mackerel and anchovy were the other important species. The leading shellfish products were mussels and shrimp.

During January-March 1959, shellfish production increased as compared with the same period in 1958. But total marine fish production decreased 2,182 metric tons, or 12.5 percent, during the first three months of 1959.

Argentina's total marine and fresh-water fishery landings in 1958 decreased slightly as compared with 1957. The downward trend continued during January-March 1959 with a decrease of 2,970 tons as compared with the same period in 1958.

Table 2 - Argentine Marine Landings of Fish and Shellfish by Species, January-March 1958-59 and Annual Totals 1957-58

Species	January-March 1959	January-March 1958	12 Months 1958	12 Months 1957
	(Metric Tons)			
Fish:				
Anchovy	0.5	8.0	10,186.7	8,817.2
Sea bream (besugo)	556.4	473.2	1,649.8	1,004.4
Mackerel and mackerel-like 1/	6,736.5	11,229.3	16,027.7	21,240.2
Conger eel (corvina)	554.8	439.7	1,261.4	873.4
Hake (Merluccius hubbsi)	7,639.3	5,641.2	27,822.0	25,529.4
Shark	208.1	252.5	3,967.4	3,642.9
Other fish	1,789.2	1,622.4	6,646.3	5,612.7
Total Fish	17,484.8	19,666.3	67,561.3	66,720.2
Shellfish:				
Shrimp, small	25.3	39.1	260.6	236.5
Shrimp, large ("langostinos")	141.8	236.9	1,084.3	1,338.3
Mussels	656.0	380.5	2,044.2	2,827.3
Other shellfish	291.4	321.6	704.6	602.0
Total Shellfish	1,114.5	978.1	4,093.7	5,004.1
Total Fish and Shellfish	18,599.3	20,644.4	71,655.0	71,724.3

1/Includes caballa, cornalito, and pejerrey.
Source: Direccion General de Pesca y Conservacion de la Fauna, Argentine Government.

Table 3 - Argentine Marine and Fresh-Water Fishery Landings, January-March 1958-59 and Annual Totals 1957-58

Type of Fishery	January-March 1959	January-March 1958	12 Months 1958	12 Months 1957
	(Metric Tons)			
Marine fish and shellfish	18,599.3	20,644.4	71,655.0	71,724.3
River and lake fish:				
Food	3,426.1	3,759.5	8,593.6	8,962.4
Industrial use 1/	2,361.6	2,953.5	4,662.2	5,038.6
Total River and Lake Fish	5,787.7	6,713.0	13,255.8	14,001.0
Total Marine and Fresh-Water	24,387.0	27,357.4	84,910.8	85,725.3

1/Consists of "sabalo" (Prochilodus platensis), related to shad.
Source: Direccion General de Pesca y Conservacion de le Fauna, Argentine Government.

--By Ing. Daniel O. Alvaredo, Temperly, F.C.G.R., Argentina

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MACKEREL AND ANCHOVY LANDINGS AT MAR DEL PLATA:

The port of Mar del Plata is the most importance fishery port in Argentina. Two of the important species landed at that port--mackerel and anchovy--show considerable fluctuation in landings from season to season. (See tables 1 and 2.)

Argentina (Contd.):

Table 1 - Mackerel Landings at Port of Mar Del Plata

Month	1958/59	1957/58	1956/57	1955/56	1954/55	1953/54
	(Metric Tons)					
December	768	-	2,461	-	1,403	535
January	1,850	3,169	4,467	1,242	3,994	2,885
February	1,661	2,828	2,216	2,274	3,346	3,246
March	1,661	3,038	5,085	1,779	2,797	3,241
April	-	1,593	749	-	1,982	1,251
May	-	89	3,508	-	277	436
Total	5,940	10,717	18,436	5,295	13,809	11,594

Table 2 - Anchovy Landings at Port of Mar Del Plata

Month	1958	1957	1956	1955	1954
	(Metric Tons)				
August	-	-	249	247	274
September	1,925	1,922	3,257	2,087	4,774
October	5,905	4,948	4,903	6,897	1,804
November	1,449	562	606	2,765	1,855
Total	9,279	7,432	9,015	11,994	8,707

--By Ing. Daniel O. Alvaredo,
Temperley, F.C.G.R., Argentina

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SHRIMP INDUSTRY TRENDS:

Landings: Since 1956 there has been a steady drop in shrimp landings in Argentina. Landings in the first two months of 1959 were only half the amount landed during the first two months of 1958.

Table 1 - Argentina's Shrimp Landings, 1956-58 and January-February 1958-59

	January-February				
	1959	1958	1958	1957	1956
	(1,000 Lbs.)				
Shrimp, large	209	423	2,390	2,950	4,266
Shrimp, small	40	81	575	521	1,171
Total	249	504	2,965	3,471	5,437

Exports: Shrimp exports to the United States began in 1952 with 5,000 pounds, rose to 227,000 pounds in 1953, and to 530,000 pounds in 1954. A price break in the United States market in 1953-54 and some quality problems resulted in no shipments to the United States in 1955. Exports were resumed in 1956, when 22,000 pounds were exported to the United States, followed by exports of 320,000 pounds in 1957, 914,000 pounds in 1958, and 419,000 pounds during the first six months of 1959. (See table 2.)

Fleet: Argentina has about 25 vessels active in the shrimp fishery as of November 1959. These vessels are about 66 feet in over-all length and are powered with 6-cylinder 160-hp. Diesel engines. According to reports, there are no immediate plans for the expansion of the fleet in the near future.

Ex-Vessel and Export Prices: In November 1959 Argentine shrimp vessels were paid about 25 pesos a kilogram (about 14.2 U. S. cents a pound) for heads-on shrimp counting between 15 and 30 to the pound, the only sizes exported by Argentina. Ex-vessel prices for medium shrimp (31-50 count) were 12 pesos a kilogram (about 6.8 U. S. cents a pound) and for small shrimp (over 50 count) 8 pesos a kilogram (about 4.5 U. S. cents a pound).

The price of processed headless shrimp (15-30 per pound size) for export

Table 2 - Argentina's Shrimp Exports, 1956-58 and January-June 1959

Country of Destination	Quantity			
	Jan.-June 1959	1958	1957	1956
	(1,000 Lbs.)			
United States	419	914	320	22
Uruguay	-	16	100	77
Paraguay	-	3	12	1
United Kingdom	-	-	107	-
Total	419	933	539	100
	Value			
	$1,000			
United States	104	354	159	6
Uruguay	-	1	16	7
Paraguay	-	1/	2	1/
United Kingdom	-	-	14	-
Total	104	355	191	13

1/Less than $500.
Note: Export data for 1952-1955 are from United States import statistics; for 1956-1959 from Argentine official export statistics.

Argentina (Contd.):

loaded aboard reefer ships at Buenos Aires was about 55 U. S. cents a pound, which includes all costs except the profit to the exporter. Actual export prices in November 1959 averaged about 60 U. S. cents a pound for large shrimp. Export taxes amount to 10.5 percent, levied on the exporter's gross proceeds.

Since the shrimp prices dropped in the United States market, the export trade is not very attractive to Argentine exporters because of the low margin of profit for the processor-exporter. (United States Embassy in Buenos Aires, November 18, 1959.)

Australia

SPINY LOBSTER INDUSTRY, FISCAL YEAR 1958/59:

Exports: Australian exports of both frozen tails of and boiled whole spiny lobsters--7,673,199 pounds--set a new record in fiscal year 1958/59 (July 1958-June 1959) for both quantity and value. Spiny lobster tail exports in 1958/59 of 7,092,217 pounds were 22 percent more than in 1957/58. Almost all of the tails were exported to the United States and other dollar areas.

Dollar earnings from frozen tail exports in 1958/59 were estimated at US$6.9 million as compared with $5.9 million the previous fiscal year--up 17 percent.

Although prices dropped on the United States market, good prices were received for most consignments in 1958/59. Western Australian consignments accounted for 82 percent of total shipments.

Table 1 - Australian Exports of Spiny Lobsters, 1957/58-1958/59

State	1958/59		1957/58	
	Tails	Whole	Tails	Whole
	(1,000 Lbs.)			
United States	6,842	477	5,626	641
Hawaii	216	-	158	-
Singapore	11	86	12	67
Canada	13	2	10	33
United Kingdom	-	6	-	-
New Guinea/ Pacific Islands	1	5	1	6
Persian Gulf	8	-	8	-
Other	1	5	-	4
Total	7,092	581	5,815	751

In the absence of more precise information as to the value of exports from other States, the average for Western Australia, as in past years, has been applied to all shipments. However, as lots of South Australian tails normally bring higher prices, this average price may be too low. Probably final figures will show that export earnings will exceed seven million dollars.

In Western Australia, midget and small tails accounted for approximately 57 percent of total State exports in 1958/59. For the year 1957/58, midgets represented 28 percent of total exports from Western Australia, whereas they constituted 29.4 percent of all 1958/59 exports from that State. At the same time the quantity of smalls exported has fallen from 30 percent to 28 percent. There has also been a decline from 22 percent to 19.3 percent in the quantity of medium tails exported from Western Australia. This size of tail brings the highest prices on the United States market.

In South Australia, small and midget tails together accounted for 25 percent of total tail exports and medium accounted for a similar amount. The other two sizes, large and jumbo, totaled 23 percent in Western Australia and 50 percent in South Australia.

This difference in percentages of sizes exported from those two States is, to a large extent, a result of the difference in size of the two species of spiny lobsters exploited in those States. The southern crayfish (Jasus lalandii), which is obtained in South Australia, Victoria, and Tasmania, is in general a larger spiny lobster than the Western Australian spiny lobster (Panulirus longipes) which constitutes the major portion of the Western Australia catch.

Table 2 - Australian Exports of Spiny Lobsters by States, 1956/57-1958/59

State	1958/59		1957/58		1956/57	
	Tails	Whole	Tails	Whole	Tails	Whole
	(1,000 Lbs.)					
Tasmania	185	110	118	93	224	73
South Australia	1,109	266	1,092	92	1,032	182
Western Australia	5,798	205	4,605	566	3,779	73
Total	7,092	581	5,815	751	5,035	328

Size details from States other than South and Western Australia are not yet available.

Production: Australian spiny lobster production increased substantially in the main fishing grounds in Western Australia. Victoria and Tasmania together also showed an increase over the preceding year of approximately 700,000 pounds. In South Australia and New South Wales, production fell. However, total Australian production exceeded the previous year's total by nearly 4.5 million pounds.

In all spiny lobster fishing areas the increase in the number of men and vessels in the fisheries, together with generally good weather, resulted in higher production. Owing to this increase in the competition for spiny lobster, the fishermen have been forced to fish over a large area; in many cases they are now fishing out to the 60-fathom line; and at the same time operating a larger number of pots than several years ago.

The South Australian Director of Fisheries attributed that State's lower production to bad weather.

Table 3 - Australian Spiny Lobster Production, 1952/53-1958/59

Fiscal Year	New So. Wales	Victoria	Tasmania	Australia		Total
				South	Western	
	(1,000 Lbs. Live Weight)					
1958/59	471	749	3,045	4,000	17,516	25,781
1957/58	523	635	2,406	4,460	13,327	21,345
1956/57	473	689	2,579	4,385	10,763	18,889
1955/56	438	614	2,802	4,000	10,530	18,384
1954/55	510	832	3,256	4,294	10,906	19,798
1953/54	576	1,163	2,527	3,850	9,224	17,340
1952/53	543	831	2,770	3,500	8,100	15,744

Australia (Contd.):

The New South Wales Superintendent of Fisheries advised that the drop in production of 54,000 pounds was due to changeable conditions in inland waters during the fishing season.

The Western Australia Director of Fisheries reported that, although a greater number of men and boats operated, excellent weather conditions in all areas, which permitted the fishing fleet to work consistently throughout the season, were mainly responsible for the large increase in production.

The Victorian Director of Fisheries said the marked increase over the previous year was due mainly to good weather from January to June 1959.

The Tasmanian Secretary for Fisheries reported that good weather, and an active demand for live spiny lobsters in both Sydney and Melbourne, intensfied the activities of fishermen both in old established areas and the new areas on the North West and Central West Coasts.

The production data in table 3 are subject to revision. There seems little doubt, on the basis of quantity of tails exported, that the data are underestimated and that 1958/59 production may exceed 26 million pounds live weight (Australian Fisheries Newsletter, October 1959).

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TWO VESSELS PLAN TO EXPORT TUNA CATCHES TO UNITED STATES:

Australia's two leading tuna vessels, Fairtuna and Tacoma, which fish from Port Lincoln, South Australia, are in New South Wales for the earlier tuna season there. The respective owners of the vessels intend to export their tuna catch, frozen whole, to the United States west coast. Export is being handled for them on a management/cost basis. Pending export from Sydney, the fish will be held in freezers there.

After the New South Wales tuna season, Fairtuna and Tacoma will return to Port Lincoln to fish.

Australia's tuna canneries in New South Wales had received 157 tons of the season's tuna to mid-September 1959, then bad weather spoiled fishing. A new tuna clipper, Estelle Star, is almost ready for fishing.

On September 15, a vessel about 300 tons, flying the Chinese Nationalist flag, was seen apparently long-lining tuna about 10 miles inside Rolley Shoals, 180 miles west of Broome, Western Australia. (Australian Fisheries Newsletter, October 1959.)

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USE OF AIRPLANES FOR FISH SPOTTING INCREASING:

There are now four planes regularly employed in Australia spotting fish.

Fishermen of Lakes Entrance, Victoria, took delivery at the end of August 1959 of a £5,000 (US$11,300) Piper Super Cub aircraft imported from the United States. They bought the plane primarily for Australian salmon (Arripis trutta) fishing. When a worthwhile school is sighted, the plane calls the fishing boats by radio.

A fishery firm and canner of Sydney was the pioneer of commercial fish spotting by plane in Australia, and still regularly employs the Piper Cub aircraft which came to Australia on the Fijian tuna clipper Senibua in 1950. The plane pilot is paid a retainer and a bonus based on the amount of fish landed.

At Lakes Entrance, an Auster plane is owned and operated by an owner of a salmon boat.

In Western Australia, an Auster plane, owned privately by a cannery operator, is also used by him to spot "salmon" schools for fishermen who supply his canneries.

A whaling company of Albany uses a chartered plane, as required, to spot whales.

The pioneer of whale spotting by plane in Australia was the company that operated the station at Point Cloates. Since they took over the former Australian Whaling Commission station at Carnarvon and concentrated all their whaling from that port, they have not used aircraft, but they have an arrangement with an airline that when it next has a helicopter available, it will be used for experimental spotting of whales. (Australian Fisheries Newsletter, October 1959.)

British East Africa

LAKE VICTORIA FISHERIES SERVICE UNDER HIGH COMMISSION TO END:

The Central Legislative Assembly of the East Africa High Commission voted on September 8, 1959, to hand over the responsibilities and assets of the Lake Victoria Fisheries Service to the individual territories--Kenya, Uganda, and Tanganyika.

Lake Victoria, Kenya. A floating screen about 200 feet long constructed from papyrus rushes is poled out into the lake a short distance from shore. Two ends are drawn together forming a trap out of which surface-swimming fish cannot escape.

The date for winding up the Fisheries Service is upon repeal of the Act establishing the Service, but no later than June 30, 1960. The decision was based on practical considerations, according to the Administrator of the East Africa High Commission, who said that treating the fisheries on a territorial basis would be preferable on account of the different requirements of the individual governments. The Economic Secretary of the High Commission, who moved the motion to split up the fisheries service, stated that the Lake Victoria Fishing Board had some time ago reached the conclusion that in terms of dealing with its fisheries, Lake Victoria represented a number of lakes within a lake.

Both the Kenya Minister for Finance and Development and the Kenya Minister for Commerce and Industry described the measure as a "retrograde step." The Minister for Commerce and Industry stated that history had shown that generally speaking with inland waters some regulations to bind the common users were necessary if the fisheries were to survive, and that "this is the first retreat from common sense on the basis of interterritorial cooperation."

Officers of the Lake Victoria Fisheries Service will, in most cases, be transferred to the various territorial governments. Assets will be taken over by the territorial governments where required for continuation of specific functions; other assets will be sold and the money raised used in conjunction with Colonial Development and Welfare funds for projects at the East African Fishery Research Organization (a High Commission function) at Jinja, Uganda. (United States Consul in Nairobi, September 11, 1959.)

Canada

BRITISH COLUMBIA CANNED SALMON PACK LOWER IN 1959:

The 1959 canned salmon pack by British Columbia canneries of 1,089,799 cases (48 1-lb. cans) was down sharply from the near-record of 1,900,025 cases (revised) packed in 1958. Although the 1959 pack was much lower than that for 1958 and the 1955 pink and sockeye cycle year, it was considered to be fair by the

Canada (Contd.):

A Canadian purse seiner, one of the more important types of British Columbia fishing vessels, sailing out to seek the schools of salmon.

Table 1 - Pack of British Columbia Canned Salmon, 1954-59

Species	1959	1958 1/	1957	1956	1955	1954
	(Standard Cases--48-1-Lb. Cans)					
Sockeye (red)	256,420	1,074,305	228,452	320,096	244,821	680,718
Spring (king)	15,760	10,550	10,481	11,671	17,853	14,080
Steelhead	1,254	1,205	1,126	1,254	1,590	3,733
Blueback	10,134	11,103	12,147	10,549	10,544	4,302
Coho (silver)	214,029	120,424	180,911	207,366	175,179	123,778
Pink	458,229	451,802	751,608	363,633	831,253	335,550
Chum (keta)	133,973	230,636	239,539	203,710	124,860	580,575
Total	1,089,799	1,900,025	1,424,264	1,118,279	1,406,100	1,742,736

1/Revised.

biologists concerned with the conservation of the salmon of the Fraser River system. Price disputes between the salmon fishermen and canners early in the 1959 season curtailed the catch of sockeye salmon and resulted in a loss of about 200,000 cases.

Note: Also see Commercial Fisheries Review, March 1959, p. 61.

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BRITISH COLUMBIA EX-VESSEL AND CANNED SOCKEYE SALMON PRICES UP SHARPLY:

From 1950 to 1959 ex-vessel prices paid to British Columbia fishermen have increased 55.0 percent and during the same period the export price of canned sockeye salmon has advanced 45.8 percent, according to the Fisheries Association of British Columbia.

British Columbia Sockeye Salmon Ex-Vessel and Export Prices

Year	Ex-Vessel or Fishermen's Price (Canadian ¢/lb.)	Export Selling Price (C$/48-lb. Case)
1960	32	-
1959	31	40-46
1958	30	37-40
1957	28	40-38
1956	26	40
1955	24	35-38
1954	22	30-33
1953	22	30
1952	25	30
1951	25	34
1950	20	28-31

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Canada (Contd.):

WEST COAST SALMON INDUSTRY TRENDS, 1959:

The dominant features of the 1959 Canadian west coast salmon fishing season were: a two-week strike which tied up the fishing industry during the latter part of July and the first part of August; an unusually high catch of Fraser River sockeye salmon for an off-season year; and the high price for canned salmon resulting from short supply and the increased price for raw fish. Another significant feature was the fact that less than ten percent of the salmon migrated through Johnstone Straits as compared with a much larger percentage in 1958.

The 1959 Canadian salmon pack, measured in 48-pound cases, was about 1.1 million cases. Of this amount, 253,000 cases were sockeye--the most valuable species. Authorities believe that had the two-week strike not taken place, the pack would have been about 200,000 cases more.

On the other hand, the price for salmon has reached an all-time high in the export market. Canners as of mid-October 1959 reported prices of C$46 a case (48-pounds) for sockeye salmon. This has resulted in some protests from British purchasers who last year were paying $37 to $40 for the same product. Canners attribute this year's high price to the increased prices they must pay fishermen for salmon (31¢ a pound for sockeye) and to the small catch, which resulted from (a) a two-week strike during the middle of the season; and (b) an off-cycle year for salmon.

A large percentage of the British Columbia salmon pack is exported. In 1958, 1.5 million cases of the nearly 2-million-case pack were exported. The United Kingdom is traditionally the best market for the West Coast salmon pack. In 1958 the Netherlands took much more than usual because of the then low price.

In 1958 a large proportion of salmon came through Johnstone Straits (Canada) destined for the Fraser River, which permitted Canadian fishermen to catch them in that area without the necessity of dividing the catch with the United States fishermen under the terms of the Canada-United States North Pacific Salmon Convention. On the basis of scale analysis of samplings of the catch which show racial origin, less than ten percent of the sockeye took this unusual migratory diversion in 1959. Local authorities believe that the cause of the unusual migratory diversion last year was the fact that the Japanese Current struck the west coast of Vancouver Island at a point north of its usual course, causing salmon to mill about the northern end of Vancouver Island rather than about the southern end. Authorities state that in 1959 this unusual ocean condition did not exist and that therefore the salmon followed a more usual migratory pattern.

Failure of the packers and the Union to reach agreement on the price of raw fish resulted in the complete paralysis of the fishing industry for two-weeks from July 25 to August 9--the peak period of the fishing season. Most estimates agree that C$4 million were lost as a result of the strike.

The two-year contract which ended the strike provided the following prices for raw fish:

Salmon Species	1960	1959	1958 1/
	. . .(Canadian Cents a Pound). .		
Sockeye	32	31	28
Pink	11	10¼	9¼
Coho, steelhead, red spring, blueback	22	21	16

1/Old contract.

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SALMON CATCH BY SPORTS FISHERMEN IN BRITISH COLUMBIA INCREASING:

An increasing number of sports fishermen are fishing British Columbia waters, principally for silver (coho) and king (spring) salmon. British Columbia is pushing its tourist industry and salmon fishing is one of the local attractions. For example, sports fishermen accounted for 204,550 salmon in 1953, as compared with 408,900 salmon in 1958. The increasing pressure placed on the fishery by sports fishermen has made it necessary for the Canadian Department of Fisheries to maintain special records on the sport catch effort. This is accomplished by sending questionnaires to sports fishermen as well as by checking with various fishing stations which rent boats to sports fishermen.

There has also been a notable increase in the number of small boats suitable for salmon fishing purchased within the last two years by British Columbia residents. Moreover, many United States tourists bring their own boats to British Columbia, either by trailer or by water.

As a result of the increased pressure on the fishery, the Canadian Department of Fisheries is gathering and assessing information to assist in evaluating conservation and management needs to ensure that the present salmon stocks are utilized and protected to a safe, sustained productivity level.

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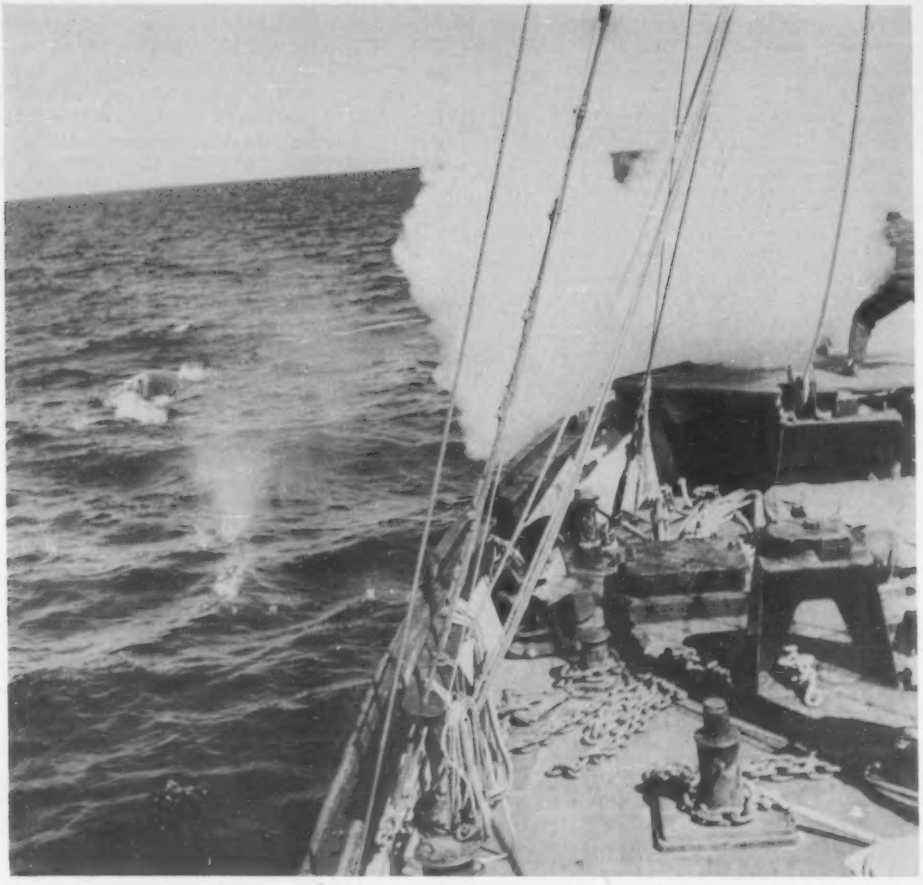
BRITISH COLUMBIA WHALING IN 1959:

The whaling company operating out of Winter Harbor Station, Vancouver Island, British Columbia, landed a record number of whales during the April-September 1959 season. But the total tonnage was below that for 1958 due to the relatively large number of small whales caught. The 1959 catch by the company's six catchers of 869 whales consisted of 369 finback, 185 sei, 260 sperm, 28 blue, and 27 humpback whales. The catch of blue whales, which are among the largest and are the most valuable, exceeded expectations. The catch of whales in 1958 was 774 and in 1957 it was 635 whales.

The depressed world market for whale oil reduced the net profit from the 1959 operations to about the break-even level, the United States Consul in Vancouver reported in October 16, 1959. (See photograph on the following page.)

Canada (Contd.):



A swirl of smoke clouds the harpoon as the gunner fires the harpoon at the humpback whale off the port bow of a Canadian whale catcher. When whale is captured, air is pumped into the carcass to keep it afloat. It is marked with flagged and lighted buoys to be picked up later and towed to the factory.

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CHAMBER OF COMMERCE POLICY DECLARATIONS INCLUDE COMMERCIAL FISHERIES:

Policy declarations of the Canadian Chamber of Commerce for 1959-60 included the following: "Commercial Fisheries: Fisheries are a basic industry of Canada that provide a livelihood for a large number of people, both directly and through secondary industry. The Chamber emphasizes the need for support of policies for the protection, conservation, and development of the fishery resources of our inland and coastal waters. Such policies require adequate recognition of pollution problems and adequate safeguards in relation to forestry and water-power developments. The importance of protecting Canada's offshore fishing interests is emphasized.

"Water: To encourage the maximum utilization of our water resources, Government should continue to prosecute with vigour all hydrometric surveys, should carefully appraise the needs of fishing, irrigation, navigation, and other interests concerned. Special attention should be devoted to pollution problems, solutions for which are becoming increasingly urgent. The Chamber believes in

Canada (Contd.):

the development of a program for the establishment of a national policy for the control, conservation, and development of water resources for multiple purposes on which all interests can unite and on which a maximum of local and provincial autonomy is assured."

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FISHERIES RECOMMENDATIONS INCLUDED IN REPORT OF ROYAL COMMISSION ON PRICE SPREADS:

Recommendations for improvement of Canadian fisheries are included in a report released on December 3, 1959, by the Royal Commission on Price Spreads appointed by Parliament in December 1957.

The seven-man Commission was appointed to study the extent and the causes of the spread between prices received by producers of food products of agricultural and fisheries origin and the prices paid by consumers for those food products.

The investigation was the natural outcome of two conditions prevalent in 1957. At the time prices for fisheries and farm commodities had been falling for a number of years with a resulting decrease in the farmers' and fishermen's share of the national income.

The Commission's report lists among the causes for increased prices to consumers, higher freight rates, labor costs, promotional activities, and rising real estate costs. On the other hand the Commission reports as causes for declining prices to commodity producers the following: overproduction, reduced per capita consumption, inefficient marketing, and lack of quality products.

Specific recommendations covering fisheries were as follows: a Federal Fish Marketing Act to pave the way for fish marketing arrangements similar to compulsory agricultural marketing boards; establishment of a fish grading system and grade definitions for products processed and sold by fishermen; and improvement of statistical information available through the services of the Bureau of Statistics with regard to Newfoundland fisheries, catch and prices for fish and fish products, flow of total gross and net incomes from fishing, and incomes of fishermen including earnings from all other occupations.

* * * * *

FISH FLOUR DEVELOPMENTS:

The Canadian Fisheries Research Board of Canada's technological station at Halifax has closed one chapter in its development of fish flour, but has announced a new fish flour project that promises even greater potential than the original research experiment--exploring the abundant stocks of herring and alewives as the raw material for a new type of fish flour.

The original project with cod and haddock was a success. Not only has the fish flour produced from cod and haddock fillet waste at the Halifax station proven to be of good quality, but it has another quality that was heretofore missing. The latter factor evolving from the last stage of the experiment involved a special treatment of the product that makes it easily mixed in liquids such as milk or water. One of the problems had been the difficulty in suspending fish flour in liquid, but the new treatment has corrected that. There is now more uniform suspension and the fish product becomes as easily suspended in milk or water as does ordinary flour.

Capping off the fish flour experiment was the recent work which indicated that the product, which is roughly 90 percent protein, has a nutritive value equivalent to egg albumen, which is the standard used in nutritional assays.

The station's venture into the herring-alewife field as a source of fish flour has met with good results so far. While it is true that herring fish flour is not as white (it is slightly grayish) as the product made from cod and haddock, it is, for all practical purposes, tasteless and odorless.

Experiments so far also indicate excellent fish flour can be produced from alewives. Work is being carried on to measure the nutritional value of the new products. Analyses of the amino acid content of the new flours will be followed by nutritional assays made on rats.

Development of fish flour was a postwar project sponsored by the Food and Agriculture Organization of the United Nations. It was undertaken by many of the world's leading fishery research laboratories, including the station at Halifax. The program was prompted by a desire to supply underprivileged nations with a cheap supply of animal protein. There was another reason too for emphasis on the work in countries in the Western Hemisphere. For instance, dietetic studies showed that in Canada and the United States there was need for additional proteins in some diet formulations, especially for people engaged in heavy manual work, postoperative patients, and elderly people. One of the simplest uses of the product has been as an additive to bread and cereals.

Raw material for fish flour made from cod and haddock is the trimmings from fish filleting (but not the heads). In the case of herring and alewives the whole fish is used. From the latter species byproducts other than fish flour are also being developed.

Abundance of herring and alewives on the east coast of Canada gives the current experiment an added attraction. That is the economic feature which, in all probability, would make production of the flour cheaper than the "white fish" flour. (Canadian Trade News, October 1959.)

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Canada (Contd.):

SWORDFISH VESSEL TRIES NEW ELECTRONIC HARPOON:

A new electronic harpoon, which is a modified version of one originally developed by a West German fisheries scientist, was demostrated aboard the swordfish vessel Terry and Gail off the Nova Scotia coast in the summer of 1959.

Using the new harpoon showed that in 11 hours of fishing at the height of the season, 13 swordfish were sighted, 13 were killed, and 11 were landed. The two escapes were said to be the result of faulty barbs.

The modified version of the electronic harpoon which has been developed by the research staff of a United States company uses a 250-volt charge which is carried by cable (replacing the former rope) to the harpoon head. The shock instantly kills the swordfish which means that it can be landed in a matter of a few minutes as compared with the average of 30 minutes to 3 hours using the old technique. It is also reported that killing by shock leaves the meat of the swordfish in better condition than if caught after a wild struggle.

Ceylon

SHRIMP FISHERY:

The catch of shrimp in Ceylon is estimated to be about 0.5 million pounds annually. Small shrimp are available in local markets, but the catch is not considered important enough by Ceylon's Department of Fisheries to show it separately in official statistics.

The small catch of shrimp is taken in lagoons or near shore with cast nets by wading fishermen. Imports during 1958 amounted to about 1.7 million pounds of dried shrimp, mainly from India. No shrimp is exported.

A research officer provided under the Colombo Plan to the Department of Fisheries has conducted a survey of shrimp fisheries for over two years. His survey located some of the shrimp breeding grounds, but the survey was discontinued in favor of an investigation of the spiny lobster resources in the waters around Colombo.

Development of a fishery for shrimp is not included in the program of fisheries development under the Ten-Year Plan. Under present conditions it is unlikely that Ceylon will become an exporter of shrimp to the United States in the near future. (United States Embassy in Colombo, December 4, 1959.)

Colombia

MARKET FOR FROZEN TUNA INCREASING:

Frozen tuna was available in Barranquilla, Colombia, during most of November 1959. As the best grade of tuna retailed at only two pesos a pound (about 29 U. S. cents a pound at the free rate of exchange), it represented a saving to workers on their food bills. The tuna has been accepted by all sectors of Barranquilla, not merely in lower-class neighborhoods. As a result, distributors are now found in nearly all parts of the city, including the better residential areas. The tuna has been supplied by the Japanese fishing vessel Seiun Maru.

The fish canning firm engaged in the marketing of tuna recently made statements indicating that the marketing of tuna will greatly increase and will be extended throughout Colombia. The firm plans to introduce 500 tons of tuna monthly into the country. The fish will be unloaded on both the Pacific and Atlantic coasts. (United States Embassy report from Barranquilla, December 4, 1959.)

France

LOBSTER TAILS PACKED IN VACUUM-SEALED PLASTIC BAGS ABOARD VESSEL:

The French vessel Francoise Christine is the world's first craft equipped with an installation for packing spiny-lobster tails in vacuum-sealed plastic

France (Contd.):

bags. Launched in February 1959, the vessel sailed for Port-Etienne in Mauritius a few weeks later.

Two specialists, a packaging expert and an engineer, accompanied the craft on her first trip but remained on board only 15 days until the crew had been trained to handle the vacuum-sealing plastic-packaging machinery.

Although the actual catch and packing on the first trip was not revealed, it is estimated that average production per trip will be around 25 metric tons. The Francoise Christine uses trawl nets for catching the spiny lobsters, which are cut, packed in plastic bags, vacuum-sealed, and then frozen.

Freezing is carried out in three tunnels with a capacity of three tons per 24 hours. The tails are then stocked in a cold storage hold with a temperature of -9° F. The hold has a capacity of 25 tons.

The Francoise Christine can also carry live spiny lobsters in tanks with a capacity of 70,000 to 80,000 lobsters.

A second craft, Le Charleston, which will be longer, 99 feet instead of 90 feet, will have a larger capacity, and will soon be ready to operate. It is estimated that the two vessels will, between them, produce from 200 tons to 250 tons of frozen products annually, equal to 500 tons of live spiny lobsters.

Special crushing equipment crushes the discarded edible part of the body for use in the making of lobster bisque. (World Fishing, November 1959.)

French Guiana

FISHERIES EXPANSION INCLUDED IN PROPOSED DEVELOPMENT PLAN:

Expansion of fisheries is included in a new economic development plan for French Guiana. Various parts of the plan have been under discussion for some time and final completion was scheduled for December 31, 1959.

The three principal objectives of the plan as it concerns fisheries are: (1) to assure sufficient fish for consumption in French Guiana; (2) to exploit the shrimp grounds off the Guiana coast and develop at Cayenne a packing and shipping industry for shrimp; and (3) to build a plant for the manufacture of fish meal (for fertilizer and animal feed) by utilizing a fish known as "poisson limon," which is found in coastal waters and the estuaries of French Guiana. This species is plentiful on the muddy bottom and is not utilized as food at the present time. (United States Consulate, Martinique, November 10, 1959.)

German Federal Republic

CERTIFICATE OF INSPECTION FOR FISH MEAL IMPORTS REQUIRED:

An ordinance passed by the Hamburg Senate on February 14, 1958, "for the protection against the danger of introduction of salmonella through feedstuffs of animal origin imported from abroad," concerns West German imports of fish meal as well as other animal feeds. This ordinance forms a part of uniform German state legislation in this field, the provisions of which are applicable to all fish meal imports into Germany.

Although the United States exports very little fish meal to West Germany or any other country, an understanding of the regulations may save present or future United States exporters from losses. One misconception on the part of United States fish meal exporters is that the "certificate issued by the competent authority" mentioned in the ordinance (Section 2) means a certificate issued only by the U. S. Department of Agriculture. Officials of the Hamburg Hygienic Institute state that such certificates issued by competent Federal or state authorities are equally acceptable, but that they must be written in German. While such a certificate does not eliminate the necessity of inspection at the port of entry, German customs authorities may

German Federal Republic (Contd.):

turn back an uncertified shipment. Shipments found to be infested with salmonella may be sterilized under customs supervision at the port of entry and thereafter admitted. (United States Consulate dispatch from Hamburg, November 23, 1959.)

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APPROPRIATIONS FOR FISHERIES, FISCAL YEARS 1958/59 AND 1959/60:

Appropriations by the West German Federal Government for fisheries for the fiscal year beginning April 1959 and ending March 31, 1960, amounted to about US$4.1 million. Appropriations for fiscal 1959/60 were lowered by about US$200,000 from fiscal year 1958/59 appropriations. Funds for fisheries included subsidies on fuel oil for inshore craft, loans for construction and modernization of fishing vessels, subsidies on loans made to the fishing industry by commercial banks, and funds for operation of and construction of facilities for the Federal Fisheries Service.

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West Germany's Appropriations for Fisheries, Fiscal Years 1958/59 and 1959/60

Purpose	Fiscal Year 1959/60[1]		Fiscal Year 1958/59[1]	
	1,000 Deutsche Marks	US$ 1,000	1,000 Deutsche Marks	US$ 1,000
Diesel fuel subsidy for luggers and cutters	4,000	959	3,000	719
Temporary medium-term loans for cutters and luggers	480	115	750	180
Revolving loan fund for building and modernization of cutters	350	84	800	192
Total in Revolving Fund	(5,000)	(1,198)	(4,650)	(1,115)
Loans from amortization of ERP investments for construction of factory-trawlers	6,000	1,438	6,000	1,438
Subsidy of interest rates of commercial loans for building and modernization of luggers, cutters, and factory-trawlers	400	96	600	144
Subsidy of interest rates of commercial loans for building of central freezing and distribution facilities	100	24	200	48
Subsidy of interest rates of commercial medium and short-term loans for trawler companies in financial distress	100	24	550	132
Management advice program for the cutter fishing companies	100	24	100	24
Exploratory fishing and gear research	800	192	500	120
Contribution to the Scientific Commission for the exploration of the Seas, Bonn	150	36	160	38
Operation and maintenance of the fishery research vessel Anton Dohrn	805	193	796	191
Federal Fisheries Research Institute, Hamburg, Including:	1,997	479	2,601	623
Construction of new building for Institute[2]	(300)	(72)	-	-
Construction of new building for Biological Institute, Helgoland[3]	-	-	(785)	(188)
Testing of fishery products	(9)	(2)	(18)	(4)
Operation and maintenance of Federal Fisheries Policing and Protection Service of 3 vessels	1,941	465	1,957	469
Construction of third fisheries protection vessel[4]	-	-	32	8
Contributions to International Organization:				
International Council for Exploration of the Sea, Copenhagen	24	6	24	6
Overfishing Convention of 1946, London	3	1	3	1
International Council for North Atlantic Fisheries	10	2	7	2

1/Fiscal Year April-March.
2/Total cost of project DM4,449,000 (US$1,066,000).
3/Total cost of project DM4,700,000 (US$1,127,000).
4/Total cost of project DM2,997,000 (US$718,000) vessel placed in Service in 1957.

Guatemala

SHRIMP FISHERY TRENDS:

The Guatemalan shrimp fishery has developed slowly, due principally to the fact that there are no areas on the Pacific Coast where most of the shrimp resources occur. Informed observers estimate that eventually Guatemala can produce between 1-3 million pounds of headless shrimp a year. According to reports no shrimp exports have been made since August 1959. The break in the United States market has made it more profitable to sell the catch locally. Local retail outlets are now disposing of about 20,000 pounds of frozen shrimp a month, or all of the current production.

No official statistics on shrimp landings are maintained, but according to estimates by observers, landings (heads-off weight) in 1956 and 1957 totaled 30,000 pounds, rose to 100,000 pounds in 1958, and were close to 300,000 pounds during the first 10 months of 1959.

For 1959 it is estimated that about 75 percent of the catch was Penaeus schmitti from the Caribbean Sea and about 20 percent was Penaeus stylirostris from the Pacific Ocean. The remaining 5 percent was a mixture of various species of Penaeus from both the Pacific and the Caribbean.

As of November 9, 1959, there were three shrimp vessels fishing in the Caribbean Sea and one in the Pacific Ocean. However, there were 3 more boats tied up for repairs in the Caribbean and one vessel under repair in the Pacific and scheduled to go into operation before December 1. A recently-arrived trawler-freezer was scheduled to start Pacific operations immediately.

In the spring of 1959, the Caribbean shrimp trawler fleet built up to 12 boats, but fishing slacked-off and 6 of the vessels returned to the United States. The fleet as of November 1959 consisted of two double-rigged (rigged for fishing two shrimp trawls simutaneously) trawlers, 60 and 68-feet in length, two old Biloxi-type luggers about 45 feet long (only

Guatemala (Contd.):

one operating), and two smaller craft about 35 feet in length (neither of which was active).

The trawler-freezer now in the Pacific operated there for about five weeks during the spring of 1959, then transferred to the Caribbean for a short period and returned to the United States for repairs. This vessel is a 78-foot converted purse-seiner. She is double-rigged and has glucose-brine freezing equipment. The other two vessels are standard-type shrimp trawlers.

No shrimp trawlers are under construction in Guatemala, but there are numerous and varied plans for bringing in more trawlers. Much will depend on the price of shrimp in the United States.

The Guatemalan Caribbean coast is extremely limited in area and so are the shrimp nursery grounds. Guatemala's Pacific coast, where most of her shrimp potential lies, is definitely handicapped in not having a port where vessels can get shelter, load and unload cargo, and obtain repairs.

There are only two shrimp fishing companies operating in Guatemala, with only one exporting shrimp in any amount. Practically all of the shrimp exported to the United States during 1959 were fresh. The fresh shrimp were packed in plastic bags with ice and transported by air. Air freight to Miami or New Orleans costs 5 U. S. cents a pound. Maximum plane capacity was 10,000 pounds per trip, but frequent trips were made with less than capacity loads.

Local wholesale prices run 75 U. S. cents a pound for shrimp 20 count and larger. Counts of 21-25 and over wholesale at 60 cents a pound. Very few shrimp over 30 to the pound are landed in Guatemala.

There are neither export controls nor export taxes. There is a municipality (severance) tax of 3 U. S. cents a pound, but an effort is being made to have this removed or reduced.

There is one small shrimp freezing plant in Guatemala. It is located at Champerico on the Pacific coast. Freezing is done in a cold room with a reported capacity of 5 tons daily. The plant also has a daily flake-ice capacity of 2 tons and a storage capacity of 5 tons. (United States Embassy dispatch from Mexico, November 18, 1959.)

Iceland

HOPES TO INCREASE SALES OF FROZEN FISH BLOCKS TO U. S.:

A United States Customs Court ruling has altered the tariff or customs classification of frozen fish fillet blocks, and effective September 15, 1959, fish blocks made from groundfish are dutiable under Tariff paragraph 720 (b) at either $12\frac{1}{2}$ percent ad valorem or one cent a pound, depending on whether or not the blocks are packed in bulk or in containers weighing with contents, less than, or more than 15 pounds each. The definition of "immediate containers" by U. S. Bureau of Customs is the "outer cardboard carton holding the 4 or 5 frozen fish blocks." Therefore, fish blocks are now dutiable at 1 cent a pound instead of $1\frac{7}{8}$ cents under the quarterly fillet quota and $2\frac{1}{2}$ cents if imported over the fillet quota. Also, imports of fish blocks now do not fall under any quota provisions.

An article in the Icelandic newspaper Morgunbladid of November 10, 1959, points out that the lower U. S. tariff regulations now in effect on frozen fish blocks should result in more exports of Icelandic fish blocks to the United States.

The article also stated the Customs ruling represented a tariff reduction of approximately $300,000 a year for Icelandic shippers, based on 1959 sales of fish fillet blocks to the United States.

The export of fish fillets in block form (11 to 13 pounds per block) to the United States was begun in 1953.

Morgunbladid's reporter asked the director of the Icelandic freezing plants corporation what effect this would have on the sale of fish to the United States. "He stated that it would facilitate and, it was hoped, increase the sale of fish to that country. This makes the American market more favorable for us Icelanders, in comparison with other fish markets. . . . He wished to point out that advertising was unavoidable in order to maintain and develop markets in the United States. The market could undoubtedly be increased by means of suitable, sensible advertising but, unfortunately, the funds which the corporation could use for advertising were very limited.

"The market for fish in the United States is good," said the director, "and it will undoubtedly increase considerably. The consumption of fish in the United States is still very low and, even if the consumption of fish per capita does not increase, the population does so by approximately 3 million per year. In order to meet that increase the Americans have to obtain additional fish amounting to approximately 15,000 tons per year."

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FISH-FREEZING PLANTS NEED MORE TRAWLERS:

Some of Iceland's outlying ports have obtained loans for the building of local freezing plants and there are now 38 such

Iceland (Contd.):

plants in Iceland. These plants are now turning to the Government for help in obtaining the fishing vessels necessary to ensure raw material to keep the plants operating.

The twelve 250-ton trawlers ordered in 1958 from East Germany form part of this scheme and 3 of these were expected to be delivered before the end of 1959. In addition, 8 larger trawlers are to be ordered from West German yards for delivery in 1960-61. A definite commitment has been made for 4 of these trawlers and favorable terms are reported to have been obtained.

Considerable dissatisfaction has been expressed over the performance of the first of the East German 250-ton trawlers, which was delivered to an Icelandic north coast firm. It is claimed that the East German trawlers have a very small capacity for their size and that thay are not really suitable for the purposes for which they were bought--fishing in home waters. (The Fishing News, November 6, 1959.)

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FISHERY LANDINGS, JANUARY-SEPTEMBER 1959:

Icelandic fishery landings during January-September 1959 were 15 percent higher than in the same period of 1958 and 29 percent higher than during January-September 1957. Cod and haddock landings were down, but landings of herring, ocean perch, and flounder were up in 1959. (Aegir, November 1, 1959.)

Icelandic Landings[1/] by Species, January-September 1959 with Comparative Data

Species	January-September		
	1959	1958	1957
	(Metric Tons)		
Flounders:			
Plaice	768	536	967
Lemon sole	212	153	1,115
Megrim	629	362	142
Witch	143	156	89
Dab	33	19	-
Halibut	751	666	559
Skate	558	602	162
Cod	203,457	221,127	180,961
Haddock	12,672	14,558	15,417
Ling	1,779	3,063	2,362
Wolffish (catfish)	8,429	9,371	8,416
Ocean perch (redfish)	85,687	63,256	47,438
Saithe	8,898	9,751	8,931
Cusk	2,364	4,213	2,795
Herring	159,916	94,151	105,342
Other	1,314	1,154	1,974
Total	487,610	423,138	376,670

1/Except for herring which are landed round, all fish are landed drawn.

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FISHING FLEET TRENDS, NOVEMBER 1959:

Since the stevedores at Grimsby, England, on October 26, 1959, lifted their ban on unloading fish from Icelandic trawlers, those vessels have reported good returns on their catches. The Icelandic trawlers have also received high prices at other British ports and in West Germany.

In November, the Icelandic trawler fleet was concentrating on the cod fishery off Iceland and Greenland. However, three trawlers were reported making good catches of ocean perch on new grounds discovered by the Germans.

The City of Reykjavik on November 3, 1959, authorized a loan of about Ikr. 10 million (about US$615,000) in foreign currency to start the program of converting from steam to Diesel the trawlers owned by the Reykjavik City Trawler Company. It is expected that the Ingolfur Arnarson will be the first vessel to be converted starting in the spring of 1960. Complete conversion will cost about Ikr. 5-7 million (US$308,000-431,000) per vessel. After conversion, operating costs will be reduced and the hold capacity increased from 250 metric tons to 300 tons.

For several months a controversy has raged over the many alleged shortcomings of the 250-ton trawlers built in East Germany. Three of the trawlers delivered in 1958 have been tied-up in Akureyri for repairs. According to reports, the aluminum lining of the fish holds is inferior and all the concrete ballast has had to be replaced. In addition, all the auxiliary engines of East German manufacture are reported to have broken down. Five East German shipyard experts have been in Iceland to try and correct the faults in the vessels. (The United States Embassy in Reykjavik reported on November 11, 1959.)

Note: Iceland kroner converted at rate of Ikr. 16.26 equal US$1.

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Iceland (Contd.):

NONGOVERNMENTAL 1960 TRADE AGREEMENT WITH EAST GERMANY INCLUDES FISH:

The nongovernmental trade agreement between Iceland trade associations and East Germany was renewed in Berlin on November 10, 1959. The agreement provides for exchange of goods of about US$5 million each way or about the same as in 1959.

On November 14, 1959, it was announced that the East Germans would purchase 10,000 barrels of Iceland south coast herring. Normally East Germany has taken about 15,000 barrels of salted herring from the south coast fishery, but due to unfavorable weather and scarcity of fish to November 12, it has been difficult for Iceland to fulfill commitments for herring exports. (United States Embassy from Reykjavik dated November 20, 1959.)

Italy

FISH CANNERS ASK RESTRICTIONS ON JAPANESE CANNED TUNA IMPORTS:

Italian fish canners and dealers are asking the Government to restrict imports of Japanese canned tuna in oil. The Italian Government is studying the effect of Japanese canned-tuna-in-oil imports on the Italian fish-canning industry. A concrete proposal was expected to be made during Japan-Italy trading negotiations under way the latter part of 1959

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JAPANESE FROZEN TUNA INCLUDED AMONG FREE TRADE ITEMS:

Italy is expected to include Japanese frozen tuna with items of free trade, and canned salmon and crab meat with bartered products. In the past, Japan's frozen tuna exports to Italy were bartered for Italian rice and for this reason tuna exports to Italy were limited on the basis of the quantity of rice imported by Japan to about 10,000 metric tons a year. Italian tuna imports from Japan amounted to 11,738 tons in 1958. However, in 1959 Japan's imports of Italian rice were reduced because of continued bumper crops and frozen tuna imports by Italy were cutback accordingly. But including tuna by Italy with items of free trade may mean an increase in imports of Japanese tuna. Japanese exporters are in favor of raising the quota of frozen tuna exports to Italy to 20,000 tons a year. (Fisheries Economic News, November 10, 1959.)

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TUNA INDUSTRY:

The Italian Association of Fishing Industries states that Italy's principal ports for imported frozen tuna are: Venice, Bari, Naples, Genoa, Trapani, and Palermo. During the past year or so, Italy has been receiving direct landings of tuna by Japanese tuna vessels, but it also receives imports from Norway and one or two other European countries.

There are about three leading processors of imported tuna. One is located in Genoa with a plant in the vicinity of Venice; another is also located in Genoa but has plants in Chioggia (Province of Venice), Favignana, and Formica; and the third one is located in Rome with a plant at Bari. One of the two firms located in Genoa that processes imported tuna, through a subsidiary, operates Italy's largest "tonnare" (areas where tuna are fished with fixed nets from shore) at Favignana and Formica, two small islands off the northwest coast of Sicily, in the Province of Trapani. Tuna caught in those islands is processed there. Tuna is also caught off Sardinia by another Italian firm. (United States Embassy report from Rome dated December 13, 1959.)

Japan

BERING SEA TRAWLER FISHERY TRENDS:

The Kinyo Maru, one of two fish-meal factoryships and fleets licensed in 1959 by the Japanese to operate in the Bering Sea, in mid-October 1959 was reported to have left the fishing grounds after attaining its production goal. The fleet, led by its factoryship, produced 13,000 metric tons of fish meal and some 2,000

Japan (Contd.):

tons of fish solubles, fish oil, frozen fish, etc.--a grand total of 15,000 tons of products. The fleet exceeded the 1958 production of fish meal by 4,530 tons and was scheduled to dock at Hakodate, Hokkaido, the latter part of October.

The second fish-meal factoryship fleet, Tenyo Maru, owned by two Japanese fishery firms, returned to Tokyo early in November. This was the first year of operation in the Bering Sea for this fleet, but it attained its production goal of 8,000 tons of products, mostly fish meal.

In 1960 four Japanese fish-meal factoryships and fleets are expected to operate in the Bering Sea. Two fleets will be operated by one fishery firm and will consist of the factoryships Kinyo Maru and Nissho Maru. Another fishery company, the one that operated the Tenyo Maru in 1959, will use a new mothership. A fourth fleet is being planned by still another fishery firm which expects to use as a factoryship the Gyokuei Maru, a 9,971-ton vessel which has been used as a tanker for Antarctic whaling. (Suisan Tsushin, November 6, 1959.)

Note: See Commercial Fisheries Review, September 1959, p. 76.

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CANNED FISHERY PRODUCTS EXPORTS, JANUARY-JULY 1959:

For the first seven months of 1959, Japanese exports of canned fishery products were 6.8 percent greater than in the same period of 1958. The increase was mainly in salmon.

Japanese Exports of Canned Fishery Products, January-July 1958 and 1959

Product	January-July	
	1959	1958
	(Cases)	
Crab (king and other)	399,251	387,666
Tuna:		
In oil	994,117	614,412
In brine	1,046,201	1,349,500
Other	31,327	49,357
Total Tuna	2,071,645	2,013,269
Mackerel-pike (saury)	402,829	440,905
Sardine	296,692	338,992
Salmon	1,058,107	885,461
Other fish	213,081	111,757
Shellfish	189,328	159,056
Other aquatic products	3,304	3,259
Grand Total	4,634,237	4,340,365

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CANNED PACK OF MACKEREL-PIKE:

The Japanese Export Canned Mackerel-Pike Fishery Association has announced the pack of canned mackerel-pike as of November 15, 1959: in tomato sauce 65,582 actual cases; in water 387,574 cases; and in jelly 500 cases--total 453,656 cases.

Since the canned pack quota has been established at 650,000 cases, there was still 196,344 cases to be packed to reach the quota.

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FREIGHT RATES TO UNITED STATES FOR CANNED GOODS INCREASED:

Rates per ton that are 5 percent higher became effective on October 1, 1959, for ocean freight shipments of canned goods from Japan to United States Atlantic and Pacific ports:

To Pacific Coast:
$24.50--all canned products
21.00--pet foods
To Atlantic Coast:
$30.00--all canned products
26.25--pet foods.

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EXPORTS OF FISHERY PRODUCTS, JANUARY-SEPTEMBER 1959:

Exports of fishery products by Japan during September 1959 were valued at US$21.4 million--higher by 20.9 percent from the August exports of $17.7 million and up 91.1 percent from the same month in 1958.

January-September 1959 fishery products exports were valued at $117.7 million, an increase of 12.6 percent as compared with January-September 1958. Fishery products exports in the first nine months of 1959 made up about 4.9 percent of Japan's exports of all products. (United States Embassy, Tokyo, November 6, 1959.)

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PLANS MADE TO ADVERTISE CANNED TUNA IN UNITED STATES:

Early in 1959 the Japanese had announced that ¥50 million (US$139,000) would be used to advertise canned tuna in the United States. Half of the money

Japan (Contd.):

was provided by the Japanese Government and the other half by the Japanese canning and freezing industries. The Fishery Agency and the International Tuna Society have been studying how to spend the money. A plan for using one-half of the amount has been announced and it was expected to be implemented late in December 1959.

The money is to be spent as follows:

1. Newspapers - ¥6,038,377 (US$16,800). Will be concentrated in northeastern states. Ads for Japanese canned tuna will appear 3 times in 14 newspapers, including the New York Times and the Chicago Tribune.

2. Trade paper - ¥774,132 (US$2,150). Ads will appear 4 times in the weekly Supermarket News.

3. Recipe leaflets - ¥5,687,838 (US$15,800). About 200,000 colored leaflets will be distributed at supermarkets.

4. Distribution of general information - ¥12,500,276 (US$34,700). Articles and information on tuna will be provided to newspapers and magazines and also to retail stores. These will be brought to the attention of food editors by personal interviews, telephone, and mail.

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Canned Tuna 1/ Exports by Country of Destination, January-June 1958-59

Destination	January-June		January-December
	1959	1958	1958
	(1,000 Actual Cases)		
United States	939	1,215	2,191
West Germany	105	113	287
Canada	80	70	149
Switzerland	67	40	77
Italy	38	10	37
Belgium	30	29	69
Netherlands	21	20	33
Lebanon	22	11	23
Britain	8	9	58
Egypt	15	-	-
Others	144	65	205
Total	1,469	1,582	3,129

1/Includes all types of packs--in oil, in brine, etc.

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FISHING INFORMATION ON 1959/60 WINTER ALBACORE SEASON:

According to a forecast by the Fisheries Laboratory of Tokai University, Shimizu, albacore tuna was expected to show up late during the winter of 1959/60 off Japan. It was expected that they would first show 1,200 miles ENE. of Nojima Cape around 37°03'-39°00' N. and 163°-164° E., about mid-November 1959, for only a very short time. There was also hope that the main run of the albacore would show up 700-750 miles NE. of Nojima Cape, or around 38°-40° N. and 161°-162° E., from mid-November up to mid-December 1959.

Formerly about 30 albacore boats used to fish from Shizuoka-ken ports beginning late in October. But in 1959 through mid-November practically none were in operation. It was expected that the boats would shift from mackerel-pike or saury fishing to albacore fishing toward the end of November 1959. The canners of Shizuoka district were waiting for the winter albacore to show up.

A research institute of Shizuoka Prefecture, Japan, released in November 1959 information on winter albacore fishing conditions off Japan.

"Oceanic Conditions: In the sea area east of the Sanriku (central part of Honshu), water temperatures are similar to the same period in 1958. Kurile currents are more powerful and lower temperatures are noted in general. The Black Current is running in a northeasterly direction near Kinkazan Island (off Miyagi Prefecture) and the water temperature of 18° C. (64.4° F.) is reaching 40° north latitude. A large warm current extends northward between 149°-154° east longitude and this pattern is expected to continue. The cold current is powerful east of 160° east longitude and no warm current is seen to be protruding into the area.

"Fishing Conditions: Because of a powerful cold current coming from the north, the southward movement of winter albacore tuna is expected to be earlier than usual. In the sea area north of 38° north latitude at 149°-152° east

Japan (Contd.):

longitude and 153°-154° east longitude, schools are expected to appear gradually and it is promising as a principal fishing area for offshore hook-and-line fishing. Conditions east of 160° east longitude do not warrant hook-and-line fishing judging from oceanic conditions. The promising fishing area for long-line fishing is expected to be at 164°-166° east longitude and 29°-32° north latitude with water temperatures ranging 19.8°-22.3° C. (67.6°-72.1° F.). (Fisheries Economic News, November 21, 1959.)

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RATE-OF-CATCH FOR ATLANTIC TUNA DROPS:

A substantial drop in the rate-of-catch of Atlantic tuna by Japanese fishing vessels is reported. Early in December 1959 a fleet of 20 to 40 long-line vessels was engaged in the Atlantic tuna fishery. Japanese vessels started fishing Atlantic tuna almost three years ago. The first year an average daily catch of 4,000 kan (16.6 metric tons) per vessel was reported. The next year it dropped to 2,000 kan (8.2 tons), but this was assumed to be natural for this type of ocean fishing. But in 1959, particularly since October, the catch has declined further. For instance, one vessel caught only a daily average of 1,200 kan (5 tons) and another only 670 kan (2.8 tons).

But in spite of the drop in catch rates, a Japanese fishery firm was planning to send two large tuna vessels--one 470-tons and another 1,100 tons--in January to the Atlantic for the first time. All other large Japanese fishery companies have tuna vessels fishing tuna in the Atlantic.

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SOVIET FISHERIES MISSION VISITS JAPAN:

A four-man Soviet fisheries mission arrived in Japan on November 17, 1959, for approximately three weeks of inspection of Japanese fishery facilities. The group comprised the chief of the Kamchatka Fish Conservation Bureau; a staff member of the Kamchatka Branch of the Pacific Fisheries and Oceanographic Laboratory; the chief of the Inshore Exploratory Fishing Group; and an interpreter attached to the Maritime Province People's Economic Council. Their itinerary took them to Hokkaido from November 20 to 27 for visits to salmon hatcheries and other fishery installations, after which they went to Nagasaki, Shimonoseki, and Yaizu to gather information on mackerel and tuna fishing.

The exchange of such missions has been recommended in each of the past three years by the annual conference of the Japan-Soviet Convention on Northwest Pacific Fisheries. In 1957 the exchange did not materialize because of delays in the Soviet response to Japanese communications. In 1958 each side sent about a dozen of its fishery experts, and the reconnaissance tours were conducted on a large scale in both countries. In 1959 Japan sent only four men, headed by the research chief of the Japanese Fisheries Agency, and the group confined its activities largely to an inspection of salmon-fishing operations in Kamchatka over a three-week period in August-September.

The reciprocal Soviet mission was naturally concerned principally with salmon, especially with salmon-hatching activity in Hokkaido and with Japan's procedures for enforcing the conservation regulations established by the Japan-Soviet Fisheries Commission. Soviet accusations of Japanese violations of those regulations caused the Japanese delegation much trouble at the last annual meeting of the Commission.

The 1959 mission, like that which came to Japan in 1958, also showed an interest in whatever information it could obtain about the operating techniques in other major Japanese fisheries. Reports indicate that since 1958 the Soviet fishery for saury off Japan's coast has been put on a commercial basis and there are strong indications that the Russians intend to move on a large scale into fisheries for mackerel, tuna, and bottom fish in areas which are now dominated by the Japanese.

At their first press conference in Tokyo on November 23, the Russian Mission's spokesman reported that Soviet salmon production in Kamchatka in 1959 was 25 percent under the plan because of the effects of the Japanese high-seas fishery. In Hakodate, at another press conference on November 28, it was pointed out that the Soviet fisheries had made a very poor catch, especially of pink salmon; also that the U.S.S.R. might find it necessary to shut down salmon fishing in Kamchatka altogether in 1960, but that this would have little effect unless the Japanese also took steps to cut down their catch as much as possible. (United States Embassy in Tokyo, December 3, 1959.)

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YELLOWFIN TUNA EXPORT PRICE TO UNITED STATES FIRMER:

In November 1959 landings of tuna from the Indian Ocean consisted of fewer yellowfin tuna but more "bluefin Indo" and albacore tuna. This has firmed up the export price of frozen yellowfin to the United States. The price in November 1959 was US$255 f.o.b. a ton (gilled and drawn fish of 20-80 lbs.) or about $10 higher than in August. The landed price of fresh yellowfin was about ¥98 a kilo ($247 a short ton). The higher Japanese export price is also attributed to a sharp decline in the transshipments of Atlantic tuna to the United States since August 1959.

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Japan (Contd.):

TRANSSHIPPED ATLANTIC FROZEN TUNA EXPORTS TO UNITED STATES DECLINE:

Japanese transshipped frozen Atlantic tuna exports to the United States that began in August 1958 have dropped off sharply because of the large percentage of rejects at United States west coast canneries in April and May 1959. On the other hand, there has been a substantial increase in direct landings of frozen Atlantic tuna at ports in Yugoslavia, France, and Africa. More recently direct landings in Colombia, the Canary Islands, Spain, and Libya were beginning to materialize. Further development of those new markets is expected in 1960.

Japanese Frozen Atlantic Tuna Direct Exports and Transshipments, 1959

	January-March		April-June		July-September		October-December1/	
	Tons2/	Trips	Tons2/	Trips	Tons2/	Trips	Tons2/	Trips
United States (transshipments)	7,592	21	6,082	19	2,751	11	840	4
Direct landings by Japanese fishing vessels:								
Italy	2,864	9	2,612	7	4,362	18	2,080	8
Yugoslavia	435	1	1,469	5	3,325	10	3,160	9
France	-	-	476	2	1,972	5	2,368	8
Dakar (Africa)	-	-	-	-	1,145	4	392	3
Others	454	2	-	-	574	3	530	3
Total other than U. S.	3,753	12	4,557	14	11,378	40	8,530	31

1/Planned.
2/Short tons for shipments to United States, and metric tons for other countries.

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STATUS OF TUNA STOCKS IN INDIAN AND PACIFIC OCEANS:

The Director of the Tokau University Fisheries Research Institute issued the following statements about the status of tuna stocks in the Indian and Pacific Oceans:

(1) In recent years large-size tuna caught in the Indian and Pacific Oceans are decreasing in number and more small and medium fish are being caught. It is, therefore, necessary to change fishing methods to catch more medium and small size fish.

(2) Small and medium size tuna have more mobility and the location of fishing grounds changes according to oceanic conditions. Ocean conditions are deemed important and each Japanese vessel is requested to report on its position and water temperatures in the area it is fishing to assist in assembling oceanographic data.

In recent years the tuna catch ratio in the Indian and Pacific Oceans has been on the decline and exploitation of new fishing grounds has extended into the Atlantic Ocean. All operating Japanese tuna vessels have expressed concern over decreased catches and increased operating days to catch a full load of tuna.

This condition is attributed to the fact that the catch of large fish is down and catch objectives should be shifted to small and medium fish which are more abundant than large fish. Schools of small and medium tuna are usually thick, but they are so sensitive to water temperature that a very small variation in the Indian Ocean brings about a change in their location. Accordingly, selecting fishing grounds becomes more difficult without proper oceanographic data.

Despite the fact that tuna fishing operations have been going on for the past few years in the Indian and Pacific Oceans, there are few data available on seasonal changes in ocean currents in the sea areas where tuna fishing grounds exist.

At present about 140 tuna vessels belonging to Shizuoka and Mie Prefectures are furnishing data which will be useful in assessing tuna fishing conditions. But in view of the great expanse of the Indian and Pacific Oceans, the data furnished are not adequate and the Fisheries Research Institute is calling upon vessels belonging to other prefectures to cooperate and is planning to put the collection of data on a nation-wide basis.

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Japan (Contd.):

FISHING VESSEL CONSTRUCTION UP SHARPLY:

There has been a sharp increase in fishing vessel construction in Japan, according to fishing vessel construction data for the first half of 1959 compiled by the Fisheries Agency. Actual construction of steel fishing vessels totaled 12,153 tons (30 vessels) in 1957, 18,412 tons (71 ships) in 1958, and 17,212 tons (103 ships) for the first half of 1959. Of the total for January-June 1959, tuna vessels amounted to 9,794 tons (29 craft), about twice as much as tuna vessel construction for 1958 of 4,731 tons (19 craft). Most of the increase in fishing vessel construction is in tuna vessels. (Fisheries Economic News, November 23, 1959.)

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EMIGRATION OF FISHERMEN TO ECUADOR PROPOSED:

Nagasaki Prefecture, westernmost prefecture of Japan, is planning to send a large number of fishery emigrants to Ecuador, South America. It has asked the Tokyo Fisheries College's scientific research mission, which was expected to leave Japan for Ecuador, to make an investigation. The mission is scheduled to use its training ship Umitaka Maru, 1,450 tons, for an investigation of the Galapagos Islands. Nagasaki Prefecture requested the mission to make a study of resources, fishing methods, and fishing seasons of shrimp, sardines, and tuna in Galapagos waters. (Suisan Tsushin, November 9, 1959.)

Latvia

FISH FACTORYSHIP ADDED TO FLEET:

The fishing fleet in Latvia now includes a new "floating fish processing factory" or factoryship, according to a report in Fiskets Gang (November 12, 1959), a Norwegian fishery trade periodical. The vessel, which is one of Latvia's best and most modern for catching and processing fish at sea, departed in November 1959 on its maiden trip, according to a November 27 news item in Vodnyj Transport. The factoryship was built in a shipyard in Nikolaevsk.

Malaya

JAPANESE-MALAYAN TUNA FIRM SLOW GETTING STARTED:

The joint Japanese-Malayan tuna fishing enterprise, which was established at Peran, Malaya, in the summer of 1959, is slow getting started. The construction of a cold-storage plant was under way in November. Of the two fishing vessels scheduled to start fishing for the firm, only one, the Koshin Maru, 99 tons, of Mie Prefecture, has already been chartered. The company hopes to be in full operation by April 1960, when canned tuna for export to Southeast Asia, and fish sausage and fresh tuna for local consumption will be produced and on sale.

Mexico

PROGRAM INSTITUTED FOR SALE OF FISH AT ESTABLISHED PRICES:

Considerable public and press discussion in Mexico was evident during the summer of 1959 regarding the effort of the Federal Government to assure more reasonable prices of fish to the ultimate consumer. The Direccion General de Pesca has instituted a program whereby fish may be sold at established prices, either to the principal fish market in Mexico City (the Ferreria), or elsewhere. The principle opponents of the program have been some of the fish distributors.

Some of the fishermen are not too pleased with the plan, as they must bring in some of what has hitherto been considered inferior fish which bring lower prices in order to assure sufficient fish on the market. Despite these difficulties, it would appear that the Government program assures the fisherman the opportunity of selling his fish at an established price when there is an

Mexico (Contd.):

A Chilean "Eat-Fish" poster--one of several used in Mexico to increase the consumption of fish.

abundance of fish and when there are insufficient fish, apparently the fisherman can sell the fish to markets other than the principal market in Mexico City, if he believes it is to his advantage. (United States Consulate dispatch from Veracruz, dated October 12, 1959.)

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SHRIMP INDUSTRY, NOVEMBER 1959:

Shrimp landings at Mexican east and west coast ports January-July 1959 totaled 77.8 million pounds (heads-on), 48.7 percent more than the landings in the similar period of 1958. Landings on the west coast were up 47.1 percent and those on the east coast rose 53.2 percent.

Table 1 - Mexican Shrimp Landings (heads-on), January-July 1958-1959

	1959	1958
	...(Million Lbs.)...	
Pacific coast	56.1	38.2
East coast	21.7	14.2
Total	77.8	52.4

Vessels Registered for Shrimp Fishing: During January-July 1959, a total of 7,619 fishing craft was registered for shrimp fishing in Mexico. Of this total, only 1,198 were vessels of over 10 tons. Due to possible duplication, it is estimated that there were only about 1,000 active shrimp trawlers operating January-July 1959. Fishing craft 10 tons and under are largely dugout canoes powered by oars, sail, or outboard motor and used for fishing in the inland bays and lagoons.

Table 2 - Shrimp Fishing Craft Registered in Mexico, January-July 1959

Vessel Size	Pacific Coast	Gulf Coast	Total
	.....(Number).....		
1-10 tons	3,503	2,918	6,421
11-50 tons	585	343	928
51-100 tons	155	90	245
101 tons and over	11	14	25
Total	4,254	3,365	7,619

Current Ex-Vessel Prices: Ex-vessel prices shown in table 3 are for Salina Cruz (west coast) and Ciudad del Carmen (Gulf of Mexico) and are current as of November 5, 1959. At that time in those two ports there was no price differential on the basis of species or color. This, of course, is unusual and reflects United States market conditions. In Mazatlan and Guaymas white shrimp commanded a higher price than brown.

Table 3 - Ex-Vessel Shrimp (heads-off) Prices, November 5, 1959

Size (Number/Lb., Headless)	At Salina Cruz	At Ciudad del Carmen
	..(U. S. Cents Per Pound)...	
Under 15	44	53
16-20	42	48
21-25	33	41
26-30	27	36
31-35	-	32
31-40	25	-
36-40	-	27
41-50	20	23
Over 51	15	-
51-60	-	17
Over 61	-	12

Packing, Processing, and Shipping Costs: At Salina Cruz and Cuidad del Carmen, November 1959 costs (in U. S. cents per pound) for packing, processing and shipping were: packing material, 3; export duty and other charges, 4; ocean freight to United States, 3; hauling charges, 1/2; storage charges, 1/2; association dues, 1/4. In addition, for grading, packing, and freezing at Salina Cruz costs were 7 cents a pound and at Cuidad del Carmen 3-1/2 cents a pound. At Salina Cruz there is also a cost of 1-1/2 cents a pound for freight to port of embarkation. Total costs at Salina Cruz were 19.75 U. S. cents a pound and at Ciudad del Carmen 14.75 U. S. cents a pound.

Export Prices: On shipments from the Carmen-Campeche Gulf of Mexico area, export prices for shrimp are based on f.o.b. Brownsville, Tex., prices minus 15 U. S. cents a pound. Export prices at Salina Cruz are also based on Brownsville prices minus 20 U. S. cents a pound.

Table 4 - Export Prices for Frozen Shrimp f.o.b. Mazatlan, November 1959

Size (Headless Count Per Pound)	White Shrimp Quality 1st	White Shrimp Quality 2nd	Brown Shrimp
	.....(U. S. Cents a Pound)....		
Under 10	72	67	62
Under 15	72	67	58
16-20	72	67	58
21-25	56	51	49
26-30	47	42	42
31-40	38	35	35
41-50	33	30	30
50-65	28	26	26
Over 66	26	23	21

Mexico (Contd.):

At Mazatlan on the central west coast of Mexico, November 1959 export or f.o.b. prices for frozen shrimp (as determined by deducting sales commission of 7 and 8 percent in the United States, freight, and border crossing fees) varied from 72 U. S. cents a pound for under 15 count first quality white shrimp to 21 U. S. cents a pound for 66 and over count brown shrimp.

Exports: Mexican shrimp exports during the first nine months of 1959 totaled 41.8 million pounds of frozen shrimp, valued f.o.b. at 315.4 million pesos (US$25.2 million). Exports of fresh, canned, and dried (mostly fresh) shrimp amounted to only 10,000 pounds, valued at 76,000 pesos (US$6,100). The bulk of the frozen shrimp exports were shipped to the United States. Of the 109,000 pounds shipped to other countries, a large percentage went to Nicaragua and some to Guatemala and Jamaica. Nearly all of the fresh shrimp exports of 9,500 pounds were shipped to the United States. Of the canned shrimp exports of 440 pounds, half were shipped to the United States and the other half almost equally divided among Guatemala, Spain, France, and Canada. (United States Embassy dispatch from Mexico, November 5, 1959.)

Morocco

LANDINGS OF FISH AND SHELLFISH, 1958:

During 1958 landings of fish and shellfish in Morocco amounted to about 355 million pounds. Landings of sardines made up 76.8 percent of the total. Other varieties of importance were about 17 million pounds of bluefin tuna (includes small amount of skipjack), about 2 million pounds of bonito and little tuna, and close to 22.5 million pounds of common mackerel, Spanish mackerel, and frigate mackerel. In addition, the 1958 landings included 7.2 million pounds of bluefish, 2.1 million pounds of shrimp, and 4.9 million pounds of hake or whiting.

Table 1 - Morocco's Landings of Fish and Shellfish, 1958

Species		Quantity
Latin Name1/	Common Name	1,000 Lbs.
Sardinia pilchardus	Sardine or pilchard	272,844
Engraulis eucrassicholus	Anchovy	1,600
Thunnus thynnus	Bluefin tuna	16,638
Sarda sarda	Atlantic bonito	1,698
Katsuwonus pelamis	Skipjack tuna	132
Scomber scombrus & S. colias	Mackerel & Spanish mackerel	17,118
Auxis bisus	Frigate mackerel	5,393
Euthynnus alletteratus	Little tuna	260
Merluccius merluccius	Hake	571
Merluccius senegalensis	Hake	4,367
Pomatomus saltatrix	Bluefish	7,227
Xiphias	Swordfish	486
Pagellus sp.	Sea bream	4,327
Trachurus trachurus	Horse or jack mackerel	4,011
Sargus vulgaris annularis	"	260
Chrysoptervus aurata	"	57
Sciaena aquila	Maigre	1,299
Lichia vadigo	"	539
Trigla sp.	Gurnards	1,084
Orcynopsis unicolor & Lichia arais	"	482
Morone sp.	Bass or white perch	133
Mugil sp.	Mullet	121
Mullus surmulutus	Surmullet	721
Conger conger & Muraena helena	Conger & morey eels	345
Anguilla vulgaris	Common eel	15
Alosa alosa & A. pinta	Shad	378
Scorpaena scrofa & S. poreus	Scorpionfish	64
Salpa salpa	"	371
Rhombus maximus	"	22
Soles soles	Common sole	614
Raja sp.	Skates & rays	791
Mustelus or Squalus sp.	Sharks or dogfish	701
Cadus luscus	"	661
Zeno faber	"	65
Eurytharus linguatula	"	66
Loligo & Sepia sp.	Squid or cuttlefish	1,128
Parapenaeus languostris	Shrimp	2,064
Palinurus vulgaris & P. mauritanious	Spiny lobster	45
Homarus vulgaris	Common lobster	25
Nephrops novegious	Norway lobster	27
Mytilus edulis	Mussel	156
	Unclassified fish or shellfish	6,398
Total		355,305

1/Some uncertainty as to correct spelling of latin names; obvious misspellings in original data corrected to correspond to United States usage

About 3 million pounds of tuna are canned and a small amount frozen--mostly exported to the French Customs Zone. Most of the tuna was caught by sardine purse seiners, but about one-third was caught by madragues (fixed nets leading out from shore). There are nine madragues fished in Moroccan territorial waters. (United States Consulate, Casablanca, November 30, 1959.)

Nicaragua

SHRIMP FISHERY TRENDS, APRIL-JUNE 1959:

Shrimp landings in Nicaragua fell off considerably during the second quarter of 1959 and the Collector of Customs reported only 107,000 pounds, valued at US$46,316, exported during that period. About 90 percent of the exports went to the United States.

A French-owned concern is going ahead with plans for a modern fish processing and packing plant in Bluefields, on the Caribbean Sea coast of Nicaragua, and plans to buy some fishing boats in the United States. (United States Embassy at Managua reported on November 10, 1959.)

Norway

FROZEN FILLET SALES UP FOR 1958/59:

The Norwegian cooperative sales organization Norsk Frossenfisk A/L reports a total production of 19,546 metric tons in 1958/59 (July-June), with a gross sales value of nearly Kr. 67 million (US$9.4 million). Fillet sales were 12 percent higher than in 1957/58, and total exports increased by about Kr. 5

Norway (Contd.):

million (about US$700,000). Exports to the United States alone were valued at Kr. 25 million (US$3.5 million) as against only Kr. 7 million (about US$1 million) in the preceding year.

Meanwhile, Norway's second largest frozen fish producer has announced plans to expand the capacity of its fillet plant at Hammerfest, North Norway, from 5,000 to 10,000 tons a year. This will provide jobs for some 1,000 plant workers, as compared with about 450 at present.

Under a Government bill submitted to Parliament early in November, the North Norway Development Fund would be authorized to guarantee a Kr. 12.5 million (US$1.8 million) loan to Norway's second largest frozen fish producer. The loan would help to finance the plant expansion, held to be of great importance to the economy of western Finnmark.

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RESEARCH VESSELS SEEK FISH IN DISTANT WATERS:

The Norwegian ocean research vessel G. O. Sars left the port of Aalesund early in December 1959 to search for the whereabouts of herring in the North Atlantic. After locating the main shoals, G. O. Sars will follow the herring on their eastward migration to spawn off the Norwegian coast.

During the second cruise, expected to start January 1960, the vessel was to be joined by another research vessel, the Johan Hjort, which in December was surveying fishing grounds off West Africa. Initial reports indicated that those waters offer very good conditions for factory trawlers.

Meanwhile, two Sunnmore fishing operators are actively planning to participate in the rich sardine fisheries off Ghana, possibly on a year-round basis. As a first step they have joined Ghana interests in setting up a Ghana-registered fishing firm. (News of Norway, December 10, 1959.)

Poland

FISHING INDUSTRY SEEKS NEW FISHING GROUNDS IN ATLANTIC:

With a marked decline in the Baltic fisheries over the past few years, Poland has turned her attention to searching for new distant-water fishing grounds. At the present time Poland is landing something over 80,000 metric tons of Baltic-caught fish and about 125,000 tons of fish caught in the North Sea and off the Norwegian coast.

The heavy building program for fishing vessels, and the fact that the first of the new series of factoryships is due to go into production in 1960, means however that landings are likely to be increased. By 1965, Poland plans to be landing 260,000 tons of fish annually, and nearly twice that amount ten years later. That is, she will have the capacity to do so, if she can find the fish.

Besides the Baltic and the North Sea, Poland is interested in the north and central Atlantic. But earlier this year the Jan Turlejski left Gdynia on an experimental voyage to test the possibility of using bottom trawls along the coast of West Africa. Fishing off Port Etienne, Mauritania, about 10 tons of various species of fish were caught in four days of fishing, and this was considered successful enough to make the trip worthwhile.

During May 1959, a second expedition left for Labrador Banks. Three trawlers, all oil-burning steam vessels of 500 tons, took part, much of their fishing equipment being supplied by East Germany, who also offered technical advice. The expedition took 31 days and about 200 tons of ocean perch were caught.

The third expedition in 1959 left in July for a 3-month voyage to be made by a 79-ft. cutter to the Bay of Biscay to fish for tuna. The results of this expedition will not be known for sometime. (World Fishing, November 1959.)

Portugal

CANNED FISH EXPORTS, JANUARY-AUGUST 1959:

Portugal's exports of canned fish during January-August 1959, amounted to 43,349 metric tons (2,373,000 cases), valued at US$22.3 million, as compared with 38,267 tons, valued at US$20.4 million, for the same period in 1958. Sardines in olive oil exported during the first eight months of 1959 totaled 31,294 tons, valued at US$15.1 million.

Portuguese Canned Fish Exports, January-August 1959		
Species	Metric Tons	US$ 1,000
Sardines in olive oil	31,294	15,116
Sardine & sardinelike fish in brine	1,095	221
Tuna & tunalike fish in olive oil	2,499	1,784
Anchovy fillets	4,166	3,094
Mackerel in olive oil	2,605	1,283
Other fish	1,690	765
Total	43,349	22,263

During January-August 1959, the leading canned fish buyer was Germany with 9,494 tons (valued at US$4.7 million), followed by Italy with 6,300 tons (valued at US$3.6 million), United States with 4,133 tons (valued at US$2.9 million), Great Britain with 3,732 tons (valued at US$1.7 million), and Belgium-Luxembourg with 2,751 tons (valued at US$1.3 million). Exports to the United States included 1,731 tons of anchovies, 586 tons of tuna, 1,725 tons of sardines, and 29 tons of mackerel. (Conservas de Peixe, October 1959.)

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CANNED FISH PACK, JANUARY-AUGUST 1959:

The total pack of canned fish for January-August 1959 amounted to 25,290 metric tons as compared with 26,336 tons for the same period in 1958. Canned sardines in oil (15,667 tons) accounted for 61.9 percent of the January-August 1959 total pack, up by 8.3 percent from the pack of 14,468 tons for the same period of 1958, the October 1959 Conservas de Peixe reports.

Portuguese Canned Fish Pack, January-August 1959		
Product	Metric[1/] Tons	1,000 Cases
In Olive Oil:		
Sardines	15,667	824
Sardinelike fish	541	28
Anchovy fillets	4,008	400
Tuna	3,864	138
Mackerel	406	16
Other species	804	42
Total	25,290	1,448

1/Net weight.

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COD FISHING FLEET HAD POOR SEASON:

By early November 1959 the Portuguese cod fishing fleet has returned from the fishing grounds off Newfoundland and Greenland and confirmed earlier reports of a poor catch. The Delegate of the Portuguese Ministry of Marine, who accompanied the fleet, stated that the yield per hour of trawling in the Greenland area has declined from 4.19 metric tons in 1955 to 2.45 metric tons at present. The catches of the trawl-line vessels declined from about 4.13 tons to 2.79 tons per hour fishing per vessel. The drop in the catch per unit of effort is causing grave concern to the Portuguese cod fishing industry, the United States Embassy in Lisbon reported on November 19, 1959.

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FISHERIES TRENDS, JANUARY-AUGUST 1959:

Sardine Fishing: During January-August 1959, the Portuguese fishing fleet landed 45,242 metric tons of sardines (valued at US$4,696,590 ex-vessel, or about $103.80 a ton).

August 1959 landings of sardines totaled 16,802 tons valued at US$1,712,834. Canneries purchased 59.6 percent, or 10,019 tons, of the sardines (valued at US$1,048,661 ex-vessel or about $104.67 a ton) during August 1959. A total of 6,770 tons was purchased for the fresh fish market, and 3 tons were salted.

Other Fishing: The January-August 1959 landings of fish other than sardines were principally 19,591 tons of chinchards (value US$1,334,087) and 3,031 tons of anchovies (value US$276,522). (Conservas de Peixe, October 1959.)

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FISHERY LANDINGS IN PORTUGAL, MADEIRA, AND THE AZORES, 1958:

Landings of fish and shellfish (exclusive of the whale and cod fisheries) in Portugal, Madeira, and the Azores in

Portugal (Contd.):

1958 amounted to 275,223 metric tons (about 606.8 million pounds), valued at US$31.7 million. The 1958 landings were up about 4.3 percent in quantity from the 263,805 tons (about 581.6 million pounds) landed in 1957, but dropped in value by 6.9 percent from the 1957 value of US$33.9 million. Sardine landings in Portugal in 1958 of 131,088 tons were higher by 16.5 percent from the 112,554 tons landed in 1957. However, the landed value of sardines in 1958 was down sharply (about $88.39 a metric ton as compared with $115.93 a ton in 1957) from the preceding year and reflected the slump in world markets for many canned fish products in 1958.

Note: Also see Commercial Fisheries Review, May 1959, p. 73.

Table 1 - Landings of Fish and Shellfish in Portugal, Madeira, and Azores, 1957 and 1958

	1958			1957		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Escudos	US$ 1,000	Metric Tons	1,000 Escudos	US$ 1,000
Portugal:						
Fish:						
Tuna & similar	2,475	12,192	427	1,909	10,580	368
Anchovy & sprat	13,332	28,720	1,005	7,499	38,146	1,327
Spanish & common mackerel	7,846	14,819	519	16,600	27,361	952
Chinchards	39,636	88,425	3,095	39,762	85,907	2,988
Corvina	1,375	9,075	318	957	6,878	239
Sardines	131,088	331,096	11,588	112,554	375,151	13,049
Cachucho & besugo	6,098	24,093	843	6,019	19,672	684
Pargo & common sea bream	10,506	48,418	1,695	11,519	56,555	1,967
Scabbardfish	2,614	14,358	503	1,673	8,999	313
Whiting	14,739	128,476	4,497	11,885	110,410	3,840
Other	25,853	134,070	4,692	28,895	146,194	5,085
Total fish	255,562	833,742	29,182	239,272	885,853	30,812
Shellfish:						
Crabs, lobsters, & other crustaceous	780	17,769	622	1,420	20,732	721
Squid	833	5,551	194	956	6,404	223
Cuttlefish	1,663	7,123	249	1,509	6,462	225
Octopus	697	4,644	163	650	4,741	165
Oysters	869	263	9	491	160	6
Other mollusks	1,939	1,449	51	2,331	1,697	59
Total shellfish	6,781	36,799	1,288	7,357	40,196	1,399
Fresh-water fish	533	3,671	128	536	4,817	167
Total Portugal	262,876	874,212	30,598	247,165	930,866	32,378
Madeira:						
Fish:						
Tuna & similar	1,154	5,018	176	2,747	10,243	356
Spanish mackerel	528	1,300	46	508	1,242	43
Chinchards	620	1,745	61	452	1,275	44
Pargo & common sea bream	-	-	-	32	207	7
Scabbardfish	694	3,768	132	877	3,683	128
Other	489	2,578	90	949	1,721	60
Total fish	3,485	14,409	505	5,565	18,371	638
Shellfish	17	53	2	16	46	2
Total Madeira	3,502	14,462	507	5,581	18,417	640
Azores:						
Fish:						
Tuna & similar	2,824	5,544	194	5,511	12,898	449
Spanish mackerel	273	615	22	402	1,006	35
Chinchards	3,764	4,502	158	3,677	5,125	178
Sardines	1/	1/	1/	286	884	31
Besugo	1/	1/	1/	10	67	2
Pargo & common sea bream	1/	1/	1/	24	102	4
Other	1,934	6,673	234	1,123	4,513	157
Total fish	8,795	17,334	608	11,033	24,595	856
Shellfish:						
Crabs, lobsters, & other crustaceous	22	589	21	21	542	19
Squid, octopus, and other mollusks	28	172	6	5	5	2
Total shellfish	50	761	27	26	547	21
Total Azores	8,845	18,095	635	11,059	25,192	877
Grand Total: Portugal, Madeira, and Azores	275,223	906,769	31,740	263,805	974,475	33,895

Note: Values converted at rate of 1,000 escudos equal US$35.
1/Values less than US$500.

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Portugal (Contd.):

SARDINE LANDINGS NEAR RECORD IN 1959:

During the fall of 1959 catches of sardines were good and the Portuguese canneries were active. After a late start, sardine landings improved and the total landings for 1959 will be close to a record. Landings of sardines during the last 15 days of October amounted to 14,150 metric tons, valued at about US$1,127,000.

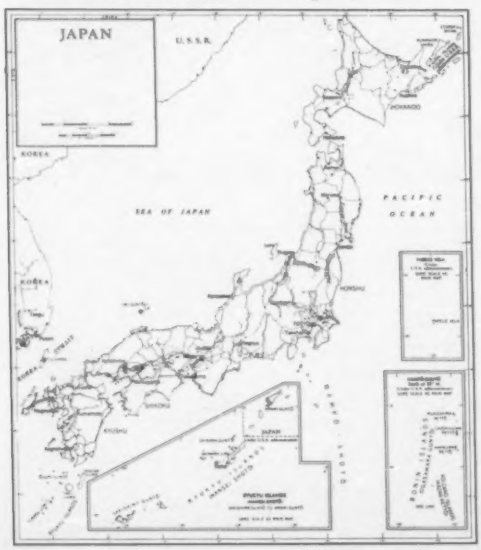
Exports of canned fish were good, but due to a shortage of tinplate, stocks on hand were declining as of November, the United States Embassy in Lisbon reported on November 19, 1959.

Ryukyu Islands

LANDINGS AND IMPORTS, 1958:

Fishery landings in 1958 in the Ryukyu Islands amounted to 15,786 short tons, excluding 7,785 tons of skipjack tuna.

Many Japanese vessels now exploit productive East China sea-fishing grounds within 250 miles of Okinawa. These fish are taken to Japan, then shipped back to the Ryukyus for consumption in frozen or processed form.



Imports in 1958 totaled 8,121 short tons, valued at ¥$2.3 million, as follows: frozen, 2,617 tons; dried and salted, 1,628 tons; dried skipjack sticks, 191 tons; canned fish, 3,685 tons. (Foreign Commerce Weekly, November 2, 1959.)

Spain

VIGO FISHERIES TRENDS, JULY-SEPTEMBER 1959:

Fish Exchange: Landings at the Vigo, Spain, Fish Exchange for the third quarter of 1959 totaled 21,636 metric tons, or 5,165 tons more than the second quarter of 1959 and 3,855 tons more than the same quarter of 1958. The value of landings during July-September 1959 at the Exchange totaled US$3,723,000 (calculated at the current rate of exchange of 60 pesetas to the dollar), a decrease in dollar value from the previous quarter of about 10 percent, and about 22 percent below the same quarter of 1958.

Hake, small hake, and horse mackerel were the most plentiful species landed in the July-September 1959 period, and in total the most valuable. The albacore tuna season, that began favorably in June and July with landings running well ahead of those for 1958, finished the third quarter at a slightly lower level than for the same period of 1958 (4,230 tons as compared with 4,567 tons).

Sardine landings, after a slow start in June and July, were more plentiful in August and especially in September than they had been in several years. The catch for the quarter totaled 5,574 tons as compared with 2,011 tons for the same quarter of 1958.

Fish Canning and Processing: Fish bought for canning during the third quarter from the Vigo Fish Exchange reached the seasonal peak at 6,575 tons, an increase of 4,919 tons over the second quarter of 1959, and 880 tons more than the third quarter of 1958. Production of fish meal and other byproducts rose from 2,314 tons during the second quarter to 3,467 tons for the July-September quarter, and an increase of 1,665 tons over the third quarter of 1958.

Increased purchases at the Exchange by the canning industry reflect the adequate supply of albacore and the increased availability of sardines over 1958. The low price paid for albacore early in the season did not hold as canners' demand for albacore increased. The average price per kilo paid in September was 14.92 pesetas (about 11.3 U. S. cents a pound or US$226 a short ton).

The substantially increased purchases of fish for the byproducts industry reflected an attempt by the fish meal industry to meet internal consumption needs, a fourth of which was estimated to have been met in 1958 through imports. As reported previously, import licenses for fish meal imports are not being granted until the National Fisheries Syndicate certifies that national production cannot meet demand. In addition, the processors have been able to purchase large quantities of sardines of inferior quality not suitable for canning, raw material which had previously been lacking, the United States Consul in Vigo, Spain, reported on October 13, 1959.

Note: Exchange rate for Spanish peseta was changed from 42 pesetas per US$1 on July 1, 1959.

Sweden

HERRING EXPORT AGREEMENT REACHED WITH CZECHOSLOVAKIA:

The Swedish west coast fish organization, which handles the export of fish from the west coast of Sweden to Communist countries, has entered into an agreement with Czechoslovakia calling for immediate delivery of 350 metric tons of frozen herring and 500 tons of winter herring to be delivered in January 1960. (United States Consulate in Goteborg, December 1, 1959.)

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HERRING SALES TO EAST AND WEST GERMANY INCREASE:

Swedish exports of herring to East Germany of about 4,500 metric tons that accumulated in cold storage plants during a temporary export stop to East Germany (ended late in October) were completed about the end of November 1959, according to a Swedish west coast fishermen's organization.

A spokesman for the organization describes the fall 1959 demand for herring in East Germany as good and sales presented no difficulties. The only problem was catching the fish.

Swedish herring was also in very good demand in West Germany where high prices were being paid. This encouraged Swedish fishermen, who operate large trawlers, to proceed to Cuxhaven when fully loaded and land their herring direct.

The reason for the large West German demand for herring is said to be a result of the poor herring catches made by the West German fishermen in the English Channel. Except for some bad weather during November which considerably reduced the Swedish herring catches off the Norwegian south-west coast at the Egersund Bank in the North Sea, the fishing there has been good. With the return of good weather later in November there were about 100 Swedish vessels fishing on the Egersund Bank, states a November 24, 1959, dispatch from the United States Consul in Goteborg.

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NEW FISHERY RESEARCH VESSEL PLANNED:

The keel of a new steel Swedish fishery research vessel was due to be laid at the beginning of 1960 at the naval yard at Karlskrona. It is expected it will be possible to deliver the vessel in the fall of 1960. Its main dimensions are as follows: length over-all 30.25 meters (99.2 feet); length between perpendiculars 25.50 meters (86.7 feet); breadth 6.40 meters (21.0 feet).

An official of the Swedish Fisheries Board in a press interview said that in addition to the vessel's survey duties it will also serve as a supply ship for herring fishermen in the North Sea.

Experimental handling and processing of fish will be part of the work of this vessel, and for that purpose there will be two fish holds. In this field collaboration has been established with the Swedish Institute for Preservation Research which cooperated in planning quick-freezing equipment.

The ship laboratories (one large one for biological and hydrographical examinations and one small one for bacteriological research) will be placed in the forepart of the superstructure on the main deck in order to obtain maximum use of daylight and ventilation. This location also has the advantage of minimum movement while at sea.

The new survey vessel will have two separate echo-sounding units constructed for different frequencies. The larger unit, comprising a recording echo-sounder, a magnifying glass, and a periphone, will be installed in the navigation cabin, and the smaller unit, comprising only a recording echo-sounder, will be located in the laboratory. Further, a marine radar, will be installed. (United States Consulate in Goteborg, November 30, 1959.)

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PLANT BEING BUILT TO MAKE FISH PROTEIN CONCENTRATE:

A plant for the manufacture of a protein product made from fish or fish waste and containing a food content consisting chiefly of albumen will be erected at Bua,

Sweden (Contd.):

a fishing village near Varberg, Sweden, according to a report in the Goteborg press. Production of the preparation is expected to commence early in 1960. From 12-15 persons will be employed in the manufacturing process at the outset. The manager of the factory will be the Hungarian engineer who invented the process.

The product will be exported to underdeveloped countries through the Food and Agriculture Organization. (United States Consulate, Goteborg, November 17, 1959.)

Union of South Africa

EAST GERMANY AND YUGOSLAVIA PURCHASE FISH MEAL AND OIL:

The Chairman of the South African Fish Meal Producers Association returned to Cape Town in November 1959 from a 2½-month sales trip abroad and reported that he had obtained orders for fish meal and oil--US$1,396,000 from East Germany and US$698,000 from Yugoslavia. (United States Consulate, Pretoria, November 25, 1959.)

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FROZEN FISH DEMAND GROWING:

A Union of South Africa firm has hired a frozen food expert to assist in the promotion of sales of all its frozen products.

It will be one of the expert's duties to tour the Union and possibly the Rhodesias advising retailers generally on the best way of handling frozen products, and of promoting rapid sales. His efforts are being backed by radio and newspaper advertising.

Among the new products recently put on the market by the firm are frozen breaded fish portions and frozen curried fish cakes, both of which are proving very popular with South African housewives.

Throughout Southern Africa in the past two years there has been a big swing towards frozen food products, and more and more products will reach the housewife in that form. (The South African Shipping News and Fishing Industry Review, October 1959.)

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SEALING OPERATIONS:

From estimates of numbers on land, it is believed that the total number of seals of all ages inhabiting South African Cape rookeries does not exceed 50,000, one third of which are young animals, the South African Division of Fisheries reports. The term "Cape rookeries" is intended to cover those islands and rocks on which seals congregate--Elephant Rock, Jacob's Reef, Robbesteen, Duikerklip, Seal Island, Geyser Rock, and Quoin Rock.

A flourishing fur-sealing industry has been developed. The industry is mainly concerned with the export of raw pelts and has neglected the byproducts. The number of pelts taken during winter sealing has increased from 27,087 in 1950 to 37,317 in 1955.

So far the annual take of seals has prevented any large-scale recruitment to the adult classes and there is no special need to control the population on any basis other than the usual commercial one of annual killing for profit.

The report states that male seals are much larger than females, the former reaching a body weight of from 450 to 800 pounds, the latter fluctuating between 200 and 300 pounds. Young seals are seldom heavier than 100 pounds.

Seals are seldom found in large numbers at sea, small groups composed of two or three animals being most frequently encountered. Larger concentrations of seals occur only when prey is particularly abundant. Their food consists of fish, squid and crustaceans.

The remarkable growth of the Union's commercial fisheries obscures any impact that the seals may be having on re-

Union of South Africa (Contd.):

sources of small fish. It is considered unlikely that the seals compete seriously with modern fish techniques (electronic shoal-location and the use of lampara seine nets), nor do they affect the commercial catch to any great extent.

Where fishing grounds are artificially depleted, the seal, as a better organized predator, is able to compensate for lack of prey by adjusting its diet and hunting elsewhere. (The South African Shipping News and Fishing Industry Review, October, 1959.)

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THREE PADDLE-WHEEL VESSELS BUILT FOR OYSTER-SHELL INDUSTRY:

Three of the most unusual vessels ever built in South Africa have been launched from a Cape Town shipyard. A shallow-draught dredger and two barges propelled by paddle wheels will gather oyster shells from a deposit estimated at tens of millions of tons in the Langebaan Lagoon.

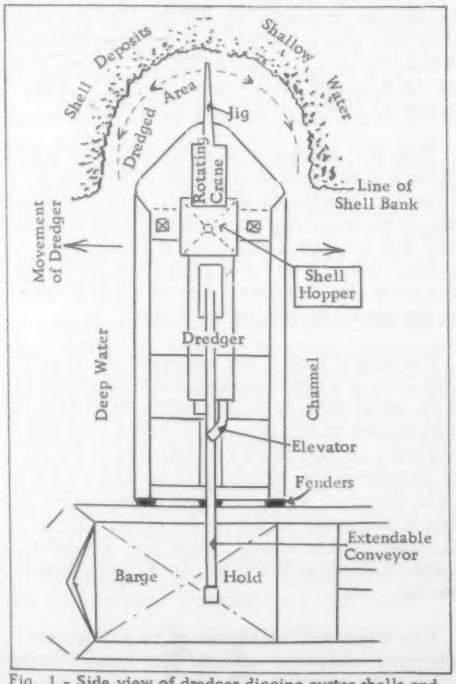

Fig. 1 - Side view of dredger digging oyster shells and loading them mechanically onto the barge, which will take them to the plant.

Behind this vast deposit lies one of the great marine mysteries of the Cape West Coast. Some time in this lagoon extension of Saldanha Bay, many years ago a species of red oysters, Ostrea atherstonei, thrived and abounded in countless millions. This species can still be found in small quantities on the Cape coast, but some change in water temperature or silting killed it off in the Langebaan Lagoon.

The oyster shells of Langebaan--in a 16 square mile area, 30 and more feet deep--form one of the largest known deposits in the world, approached in extent only by a deposit in Denmark and another in Chesapeake Bay in the United States.

The Langebaan shells have been gathered for 50 years and more, but their real value has only been realized in the past 7 or 8 years.

The shell beds, about six miles up the lagoon, are large flat deposits covered by a thin layer of silt and intersected by channels. They have been worked by a 90-year old converted lighter, which gathers the shells for washing and sun-drying ashore. These shells are then crushed and the grit and powder is despatched in hessian bags.

Production has reached 300 tons a month, all of it sold in the Union. This will now be stepped-up to 2,000 tons a month to meet all local requirements and perhaps also leave a surplus for export abroad where the market, like the Langebaan deposit, is almost unlimited.

To increase production, the South African firm is re-equipping its oyster-shell business. In addition to the three paddle-wheel vessels, a new factory was erected.

The two barges, which were launched last in September, are flat-bottomed vessels of welded steel construction. They have flat plate and cone section hulls, are each 58 ft. long, 21 ft. 4 in. wide, 5 ft. deep, and are designed to op-

Union of South Africa (Contd.):

erate in only 2 ft. 8 in. of water. Self-trimming vessels, they are designed to maintain an even keel while loading and carrying shells fed from the dredger. Each barge is equipped with two paddle wheels.

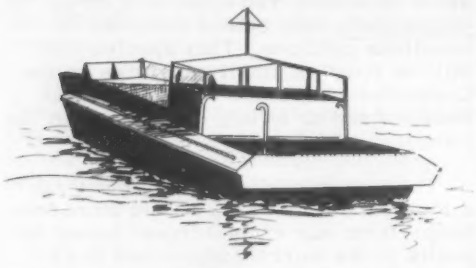

Fig. 2 - Wide-beamed 58-foot long paddle-wheel barge with shallow draft used for loading and carrying oyster shells in South Africa.

Each barge will carry 56 tons of shells in 24 containers measuring 4 ft. by 4 ft. by 6 ft. 6 in. Two types of container will be tried, one of metal framing with wire mesh to allow the shells to drip and one of solid plate with perforated plate bottom also to permit drip. These containers will be carried in a spacious hold 16 ft. 9 in. wide by 25 ft. 1 in. long.

The barges are utility craft. Buoyancy will be maintained by a watertight forepeak, a watertight compartment below the simple wheelhouse, and by watertight compartments aft around the two paddles.

The barges will probably be crewed by one man, who may be assisted by crew carried to and from the dredger.

This dredger, which is 51 ft. long, is similar in basic design and construction to the barges, but has a closed engine-room, raised bridge, and spacious accommodation for the crew.

The main paddle drive will be by a 40 hp. electric motor through double chain reduction with a tramway controller on the bridge. But the dredger's paddles are for auxiliary movement only as she will warp her way across the oyster beds and will only use them for occasional movements to other beds, to and from the factory jetty, or for trotting her moorings. Thus the main function of the engine will be to generate electricity for motors driving the dredging plant and for lighting.

Dredging of the beds will be by a grab bucket dredging crane, mounted on the foredeck. This crane will have a 20-ft. boom and all-round revolving slewing gear. The receiving hopper of the dredger is arranged so that, when slewing from dredging, the crane will not have to luff.

From the grab bucket the shell will fall into a hopper and from this into a three-stage vibrating shell-washing plant below deck, which will remove sand and other foreign matter. After washing, the shell will be lifted in stainless steel buckets and fed through a telescopic chute aft down to the containers in the barge.

It is planned that initial recovery will be 56 tons of shell in an eight-hour working day. While the dredger works into the beds, the barge will lie aft receiving the shells through the chute. In the meantime the other barge will be discharging at the factory dock. At about 3 p.m. each day this barge will leave the jetty arriving at the dredger an hour later.

The full barge will arrive at the dock about 5 p.m. and will stand all night to allow the shells to drip dry into the bilges. The next morning the dock crane will unload the vessel and replace the empty containers. A second stage would be to increase the dredging crane rate so that the barges change twice a day.

Containers will be emptied on the dock into a slow-moving slat conveyor 14 ft. wide which will in turn feed the first shore plant bucket elevator at the entrance to the factory building. From the elevator the shell will be fed to four shell-louvred steel drying bins, each with a capacity of 56 to 60 tons. This will enable each load from the dredger to stand drying for four days before processing.

The bins will discharge to a bucket-conveyor elevator which will feed a hammer mill crusher. From this crusher the shell grit and powder will go to over-

Union of South Africa (Contd.):

head sieve screens which will divide it into grit, fines, and powder. Large-size overtailings will be returned by spout to the crusher feed.

Crushed and sorted shell will be piped to grading bins for feeding to the automatic packing and weighing machines below. These machines will pack it into paper valve bags, each containing 100 pounds of shell grit, fines, or powder.

A feature of the factory and dredging plant is that all conveyors, elevators, chains, elevator and conveyor sections, and electric motor drives will be identical and interchangeable. (The South African Shipping News and Fishing Industry Review, October 1959.)

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WHALING LAND STATION SEASON IN 1959 SUCCESSFUL:

The Union of South Africa's 1959 offshore whaling season off the Natal and Zululand coasts (East Africa) extended from mid-April to mid-October 1959. During the season 1,829 whales were caught and yielded 6,285 long tons of whale oil, slightly more than 3,800 long tons of sperm oil, 71,000 short tons of whale meal, and 345 short tons of whale meat extract. As compared with the 1958 season production in 1959 increased by about 100 tons of whale oil and the yield of whale meal and extract was substantially higher.

The South African whaling firm experimented in 1959 with asdic equipment fitted to one catcher and utilized aircraft for spotting and plotting purposes. The firm is more than satisfied with the results of these innovations, but it is doubtful that next season will see an increase in this type of equipment. It is believed that it will take two years of comparison to convince the conservative management that asdic should be fitted to all catchers of the whaling fleet. (United States Consul in Durban, December 1, 1959.)

U. S. S. R.

GOOD FISHING GROUNDS FOUND IN DAVIS STRAIT OFF WEST GREENLAND:

Rich fishing grounds off the coast of West Greenland in Davis Strait have been discovered by the Soviet fisheries research vessel Muksun. The 400-mile stretch from Cape Farewell on the southern tip of Greenland to Disco Island on the west coast has been found to abound in cod, ocean perch, wolffish, and flounders.

The Muksun, whose catch on some days exceeded 12 metric tons, reported that the new grounds could be fished by all types of fishing vessels.

Purpose of the expedition undertaken by the Muksun, which carried scientists from the Baltic Sea Fisheries and Oceanographic Research Institute, was to map the ocean bed and concentrations of fish with a view to obtaining the most efficient trawling operations and improving techniques.

The maps prepared by the Muksun's oceanographers, it is expected, will help fishermen of many countries in exploiting the rich fisheries off the coasts of Greenland. (World Fishing, November 1959.)

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TUNA FISHING IN THE PACIFIC OCEAN INITIATED:

The Soviet Union has begun its first trial fishing for tuna in the Pacific Ocean, according to a report in Fiskets Gang (November 12, 1959), a Norwegian fishery trade periodical. The original news item appeared in Leningradskaja Pravda (October 18).

The first Russian specially-built long-line vessel for tuna fishing left port early in the fall of 1959. The 800-ton vessel has a Diesel motor of 600 hp. It is 151 feet long and almost 30 feet in breadth, and is equipped with special winches and fishing gear consisting of 74.6 miles of long line. The vessel can remain at sea for two months and has a crew of 25.

U. S. S. R. (Contd.):

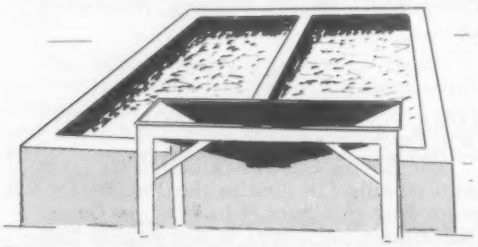
In all there are 12 tanks on the vessel calculated to hold 120 metric tons of tuna plus freezer space. Two of the tanks are for the livers of sharks, which are often taken on the tuna lines.

United Kingdom

CONTAMINATION IN OYSTERS ERADICATED BY NEW TREATMENT:

The British health authorities are permitting the sale of oysters harvested from suspected contaminated areas provided the shellfish are cleansed in tanks in accordance with the Ministry of Agriculture and Fisheries Laboratory's recommendations. A number of British oyster planters have installed and are operating cleansing tanks.

The largest cleansing plant is in West Mersea. The plant consists of three double 20 feet by 5 feet by 2 feet 6 inches reinforced concrete tanks laid side by side, with two sheds for housing water-circulating pumps, ultraviolet lamp batteries, weir tanks, and cascade towers.



Double reinforced concrete tank capable of treating 10,000 oysters at one time.

These and all the auxiliary equipment necessary to operate the plant--trays for the oysters, bagging equipment, and pumps and hoses for refilling the tanks--are enclosed by a 6-foot wooden fence. The plant covers some 400 square yards and costs between £1,500 and £2,000 (US$4,200-5,600).

Oysters are brought into the enclosure in baskets and are carefully tipped (so that none of them are damaged) on to a clean concrete surface at the head of the tanks. There they are given a thorough washing to remove all the mud. Then they are placed in 5 feet by 2 feet wood framed trays with wire netting at the bottom--500 to a tray, no more.

The trays are placed in the treatment tanks which have already been filled with clean sea water. Each double tank will hold 20 trays; so that the total number of oysters that can be treated simultaneously in that plant is 30,000.

Water is then circulated by the pumps installed in the sheds. It is drawn from the bottom of the tanks through pipes into overhead tanks in the sheds. In the tanks it passes at a very shallow depth over a weir and under ultraviolet lamps. Then it is carried to cascade towers in which it drops some 3 or 4 feet and is aerated in the process.

From the towers it is led back to large diameter pipes running round the top edges of the treatment tanks. From small diameter branch pipes, fitted at intervals in the large one, the water spurts upwards and inwards--for oxygenation--back into the tanks.

After 48 hours in the treatment tanks, the oysters are completely cleansed. They then have to be lifted from the trays and bagged for transport to market. (The Fishing News, October 16, 1959.)

Venezuela

JAPANESE-VENEZUELAN TUNA FISHING OPERATIONS IN CARIBBEAN:

The joint fishing venture in Caribbean waters by Japanese and Venezuelan interests is popular in Venezuela, according to a report from Japan. Two Japanese long-liners have been fishing in the Caribbean under an agreement between the Chiba Prefecture Fisheries Promotion Company of Japan and Venezuelan interests. The Japanese invested 49 percent and the Venezuelans 51 percent in the joint undertaking and Chiba Prefecture has supplied the two 85-ton fishing vessels and crews. The Prefecture is said to have agreed to construct two more fishing boats at a cost of US$222,222

Venezuela (Contd.):

with construction scheduled to begin by the end of 1959.

The Venezuelans report that demand for tuna caught by the Japanese is heavy and steadily growing.

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TUNA VESSELS FISHING OFF BRITISH WEST INDIES:

Several Venezuelan fishing vessels, from 60-80 feet over-all length, are fishing for tuna about 15 miles southwest of the British West Indies Island of Grenada. According to the West Indies Fisheries Bulletin of September/October 1959, the tuna are iced aboard the vessels and landed in Venezuela. Catches are reported to average 50 tuna a day per boat, with occasional daily catches of 100 tuna.

WHALE'S TEMPERATURE AND HEART BEAT RECORDED

Two Woods Hole scientists obtained a cardiogram and temperature observations of a 45-foot whale early in December 1959. For years scientists have tried vainly to obtain such information of the largest existing animals.

A marvelous opportunity occurred when a 50-ton male finwhale beached at Provincetown, Mass., on the tip of Cape Cod and stayed alive for several hours. Warned by a Woods Hole observer, Dr. John W. Kanwisher of the Woods Hole Oceanographic Institution and Dr. Alfred W. Senft of the Marine Biological Laboratory hastily collected equipment and took the measurements until shortly before the whale died.

The cardiograms showed a pulse beat of 25 per minute (human--72 per minute) and the estimated relative size of the heart as about 500 pounds, compared to some 250 grams (8.8 ounces) for a human heart. Dr. Senft also determined how the heart sits in the chest and the time interval from the pacemaker of the heart to the contraction of the ventrical. The electrodes necessary to measure the small electric currents which occur in connection with the contraction of the heart muscle were improvised by Senft by using some sharpened welding rods. These were stuck some 8 inches through the whale's blubber in positions similar to those used for a human cardiograph. The observed voltages did not differ markedly from those of man's heart, despite the size differences. Of course, it must be kept in mind that the beached whale was not a particularly happy one.

As the whale's condition deteriorated there were changes in the cardiogram not unlike those seen in humans when the oxygenation is impaired. It appeared that the whale suffered a conduction block, a common defect in man's heart.

While the cardiograms were made, Kanwisher obtained temperature measurements and collected respiration samples from the whale's blowhole. Kanwisher has worked for years on the temperature regulation of animals and has worked on questions such as: "How does a whale keep warm in polar seas" and "how does he lose heat when swimming fast"? A whale has no sweat glands and cannot take its overcoat (blubber) off. As in the case of the heartbeat of the large whales, observations have been unsuccessfully tried for years.

The Provincetown whale had an internal body heat of 92° F., while the fins and tails had a temperature of 50° F. Initially, the dorsal fin (used as a radiator) was much warmer.

Gas samples taken from the whale's breath showed that the animal's lungs were not functioning well. The whale extracted only one-third as much oxygen from the inhaled air as humans do.

The heart specialist Dr. Paul Dudley White, who has spent much time and effort to obtain cardiograms of large whales, was informed of the successful observations and offered to give his opinion on the records. Accordingly, Senft and Kanwisher met White in Boston, together with a representative of an instrument manufacturing company. It was emphasized that the obtained information is but one phase in a continuing program of observations and that much more work remains to be done. Accordingly, a program was initiated to make future plans for an expedition and to determine what sort of equipment should be readily available to prevent on the spot improvisation.

FEDERAL ACTIONS

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

LIST OF FOOD ADDITIVES GENERALLY RECOGNIZED AS SAFE ISSUED:

A list of food additives or substances generally recognized as safe appeared in an order issued by the U. S. Food and Drug Administration and published in the Federal Register of November 20, 1959. The order became effective on December 20, 1959.

The order also points out that inclusion of substances as nutrients does not constitute a finding that the substance is useful as a supplement to the human diet.

The order as it appeared in the Federal Register follows:

Title 21—FOOD AND DRUGS

Chapter I—Food and Drug Administration, Department of Health, Education, and Welfare

SUBCHAPTER B—FOOD AND FOOD PRODUCTS

PART 121—FOOD ADDITIVES

Subpart B—Exemption of Certain Food Additives From the Requirement of Tolerances

SUBSTANCES THAT ARE GENERALLY RECOGNIZED AS SAFE

Pursuant to the authority vested in the Secretary of Health, Education, and Welfare by the Federal Food, Drug and Cosmetic Act (secs. 409, 701, 72 Stat. 1785, 52 Stat. 1055, as amended 72 Stat. 948; 21 U.S.C. 348, 371), and delegated to the Commissioner of Food and Drugs by the Secretary (23 F.R. 9500), and after having considered all comments on the proposed order published in the FEDERAL REGISTER of December 9, 1958 (23 F.R. 9511), containing a list of substances regarded as generally recognized as safe within the meaning of section 409 of the act, the Commissioner has concluded that the substances in that list with the exception of carbon black, charcoal, oleic acid, linoleic acid, titanium dioxide, and ultramarine blue, are generally recognized as safe. *Therefore, it is ordered*, That the food additive regulations (21 CFR Part 121 (24 F.R. 1095)) be amended by adding thereto, under Subpart B, the following new section:

§ 121.101 Substances that are generally recognized as safe.

(a) It is impracticable to list all substances that are generally recognized as safe for their intended use. However, by way of illustration, the Commissioner regards such common food ingredients as salt, pepper, sugar, vinegar, baking powder, and monosodium glutamate as safe for their intended use. The lists in paragraph (d) of this section include additional substances that, when used for the purposes indicated, in accordance with good manufacturing practice, are regarded by the Commissioner as generally recognized as safe for such uses.

(b) For the purposes of this section, good manufacturing practice shall be defined to include the following restrictions:

(1) The quantity of a substance added to food does not exceed the amount reasonably required to accomplish its intended physical, nutritional, or other technical effect in food; and

(2) The quantity of a substance that becomes a component of food as a result of its use in the manufacturing, processing, or packaging of food, and which is not intended to accomplish any physical or other technical effect in the food itself, shall be reduced to the extent reasonably possible.

(3) The substance is of appropriate food grade and is prepared and handled as a food ingredient. Upon request the Commissioner will offer an opinion, based on specifications and intended use, as to whether or not a particular grade or lot of the substance is of suitable purity for use in food and would generally be regarded as safe for the purpose intended, by experts qualified to evaluate its safety.

(c) The inclusion of substances in the list of nutrients does not constitute a finding on the part of the Department that the substance is useful as a supplement to the diet for humans.

(d) Substances that are generally recognized as safe for their intended use within the meaning of section 409 of the act are as follows:

CHEMICAL PRESERVATIVES

Ascorbic acid.
Ascorbyl palmitate.
Calcium ascorbate.
Calcium propionate.
Erythorbic acid.
Potassium sorbate.
Propionic acid.
Sodium ascorbate.
Sodium propionate.
Sodium sorbate.
Sorbic acid.
Tocopherols.

BUFFERS AND NEUTRALIZING AGENTS

Acetic acid.
Aluminum ammonium sulfate.
Aluminum sodium sulfate.
Aluminum potassium sulfate.
Ammonium bicarbonate.
Ammonium carbonate.
Ammonium hydroxide.
Ammonium phosphate (mono- and dibasic-).
Calcium carbonate.
Calcium chloride.
Calcium citrate.
Calcium gluconate.
Calcium hydroxide.
Calcium lactate.
Calcium oxide.
Calcium phosphate.
Citric acid.
Lactic acid.
Magnesium carbonate.
Magnesium oxide.
Potassium acid tartrate.
Potassium bicarbonate.
Potassium carbonate.
Potassium citrate.
Potassium hydroxide.
Sodium acetate.
Sodium acid pyrophosphate.
Sodium aluminum phosphate.
Sodium bicarbonate.
Sodium carbonate.
Sodium citrate.
Sodium hydroxide.
Sodium phosphate (mono-, di-, tri-).
Sodium potassium tartrate.
Sodium sesquicarbonate.
Sulfuric acid.
Tartaric acid.

EMULSIFYING AGENTS

Diacetyl tartaric acid esters of mono- and diglycerides from the glycerolysis of edible fats or oils.

Mono- and diglycerides from the glycerolysis of edible fats or oils.

Monosodium phosphate derivatives of mono- and diglycerides from the glycerolysis of edible fats or oils.

Propylene glycol.

MISCELLANEOUS

Acetic acid.
Aluminum sodium sulfate.
Aluminum sulfate.
Butane.
Calcium phosphate, tribasic.
Caramel.
Carbon dioxide.
Carnauba wax.
Citric acid.
Glycerin.
Glycerol monostearate.
Helium.
Magnesium carbonate.
Magnesium hydroxide.
Monoammonium glutamate.
Nitrogen.
Papain.
Phosphoric acid.
Propane.
Propylene glycol.
Triacetin (glyceryl triacetate).
Tricalcium phosphate.
Sodium carbonate.
Sodium phosphate.
Sodium tripolyphosphate.

NONNUTRITIVE SWEETENERS

Calcium cyclohexyl sulfamate.
Calcium saccharin.
Saccharin.
Sodium cyclohexyl sulfamate.
Sodium saccharin.

Product	Tolerance	Specific uses or restrictions
ANTICAKING AGENTS		
Aluminum calcium silicate	2 percent	In table salt.
Calcium silicate	5 percent	In baking powder.
Calcium silicate	2 percent	In table salt.
Magnesium silicate	do	Do.
Tricalcium silicate	do	Do.
CHEMICAL PRESERVATIVES		
Benzoic acid	0.1 percent	
Butylated hydroxyanisole	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content, of food.	
Butylated hydroxytoluene	do	
Caprylic acid		In cheese wraps.
Dilauryl thiodipropionate	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.	
Gum guaiac	0.1 percent (equivalent antioxidant activity 0.01 percent).	In edible fats or oils.
Nordihydroguaiaretic acid	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.	
Potassium bisulfite		Not in meats or in foods recognizable as a source of vitamin B_1.
Potassium metabisulfite		Do.
Propyl gallate	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.	
Sodium benzoate	0.1 percent	
Sodium bisulfite		Not in meats or in foods recognizable as a source of vitamin B_1.
Sodium metabisulfite		Do.
Sodium sulfite		Do.
Sulfur dioxide		Do.
Thiodipropionic acid	Total content of antioxidants not over 0.02 percent of fat or oil content, including essential (volatile) oil content of the food.	
EMULSIFYING AGENTS		
Cholic acid	0.1 percent	Dried egg whites.
Deoxycholic acid	do	Do.
Glycocholic acid	do	Do.
Ox bile extract	do	Do.
Taurocholic acid (or its sodium salt)	do	Do.
MISCELLANEOUS		
Caffeine	0.02 percent	In cola type beverages.
Ethyl formate	0.0015 percent	As fumigant for cashew nuts.
Magnesium stearate		As migratory substance from packaging materials when used as a stabilizer.
Sorbitol	7.0 percent	In foods for special dietary use.
Triethyl citrate	0.25 percent	Egg whites.
NUTRIENTS		
Copper gluconate	0.005 percent	
Cuprous iodide	0.01 percent	In table salt as a source of dietary iodine.
Potassium iodide	do	Do.
SEQUESTRANTS [1]		
Isopropyl citrate	0.02 percent	
Sodium thiosulfate	0.1 percent	In salt.
Stearyl citrate	0.15 percent	

[1] For the purpose of this list no attempt has been made to designate those sequestrants which may also function as chemical preservatives.

NUTRIENTS

Ascorbic acid.
Calcium carbonate.
Calcium oxide.
Calcium pantothenate.
Calcium phosphate (mono-, di-, tribasic).
Calcium sulfate.
Carotene.
Ferric phosphate.
Ferric pyrophosphate.
Ferric sodium pyrophosphate.
Ferrous sulfate.
Iron, reduced.
l-Lysine monohydrochloride.
Niacin.
Niacinamide.
D-Pantothenyl alcohol.
Potassium chloride.
Pyridoxine hydrochloride.
Riboflavin.
Riboflavin-5-phosphate.
Sodium pantothenate.
Sodium phosphate (mono-, di-, tribasic).
Thiamine hydrochloride.
Thiamine mononitrate.
a-Tocopherol acetate.
Vitamin A.
Vitamin A acetate.
Vitamin A palmitate.
Vitamin B_{12}.
Vitamin D_2.
Vitamin D_3.

SEQUESTRANTS

(For the purpose of this list, no attempt has been made to designate those sequestrants which may also function as chemical preservatives)

Calcium acetate.
Calcium chloride.
Calcium citrate.
Calcium diacetate.
Calcium gluconate.
Calcium hexametaphosphate.
Calcium phytate.
Citric acid.
Dipotassium phosphate.
Disodium phosphate.
Monocalcium acid phosphate.
Monoisopropyl citrate.
Potassium citrate.
Sodium acid phosphate.
Sodium citrate.
Sodium diacetate.
Sodium gluconate.
Sodium hexametaphosphate.
Sodium metaphosphate.
Sodium phosphate (mono-, di-, tribasic-).
Sodium potassium tartrate.
Sodium pyrophosphate.
Sodium tartrate.
Sodium tetrapyrophosphate.
Sodium tripolyphosphate.
Tartaric acid.

STABILIZERS

Agar-agar.
Carob bean gum (locust bean gum).
Carrageenin.
Guar gum.

Effective date. This order shall become effective 30 days from the date of its publication in the FEDERAL REGISTER.

(Sec. 701, 52 Stat. 1055, as amended; 21 U.S.C. 371. Interprets or applies sec. 409, 72 Stat. 948; 21 U.S.C. 348)

Dated: November 13, 1959.

[SEAL] GEO. P. LARRICK
Commissioner of Food and Drugs.

* * * * *

WARNING ISSUED ON USE OF TERM "CHOLESTEROL" IN LABELING OF COMMON FOODS:

Addition of unsaturated fats and oils to the otherwise unchanged ordinary diet will not reduce blood cholesterol and prevent heart attacks and strokes, the Food and Drug Administration announced on December 10, 1959. Representations to the public that salad oils, shortenings, oleomargarine, and similar products have value for these purposes are false and misleading and will cause such products to be misbranded, according to a statement of law-enforcement policy published in the Federal Register of December 10.

The Commissioner of Food and Drugs said there is widespread interest in the possible relationship between blood cholesterol levels and heart and artery diseases. As a result, he explained, reference to the term "cholesterol" in the labeling of common foods now being offered to the public may have the effect of a claim of special value for preventing or treating these diseases. The Commissioner added:

"Scientific investigations of fatty substances as a possible factor in lowering blood cholesterol and preventing heart disease should be continued, and this policy statement does not interfere in any way with legitimate research and clinical evaluation of unsaturated fats in the diet. It is our responsibility, however, to point out that the public has been misled into relying prematurely on data which are still experimental, incomplete, and contradictory, and to head off false and misleading promotions based on such data."

Cholesterol is a substance that is manufactured in the body and has an important function in many of the body tissues. It is also present in animal fats and oils such as butter, lard, bacon, and meat fat. The blood level of cholesterol is controlled largely by synthesis in the body and is affected very little by the amount present in our foods. The agency further pointed out the view of nutrition scientists that it is impracticable for a person to add enough unsaturated fats to an otherwise unchanged diet to bring about any significant change in blood cholesterol. Increased weight, they add, is the only result that is likely to be achieved by increasing the intake of fats.

The policy statement, based on an extensive survey of leading medical authorities, published in the Federal Register, follows:

Title 21—FOOD AND DRUGS

Chapter I—Food and Drug Administration, Department of Health, Education, and Welfare

SUBCHAPTER A—GENERAL

PART 3—STATEMENTS OF GENERAL POLICY OR INTERPRETATION

Status of Articles Offered to the General Public for the Control or Reduction of Blood Cholesterol Levels and for the Prevention and Treatment of Heart and Artery Disease Under the Federal Food, Drug, and Cosmetic Act

Under the authority vested in the Secretary of Health, Education, and Welfare by the Federal Food, Drug, and Cosmetic Act (sec. 701(a), 52 Stat. 1055, as amended; 21 U.S.C. 371) and delegated to the Commissioner of Food and Drugs by the Secretary (23 F.R. 9500), and pursuant to the Administrative Procedure Act (sec. 3, 40 Stat. 237; 5 U.S.C. 1002), the following statement of policy is issued.

§ 3.41 Status of articles offered to the general public for the control or reduction of blood cholesterol levels and for the prevention and treatment of heart and artery disease under the Federal Food, Drug, and Cosmetic Act.

(a) There is much public interest and speculation about the effect of various fatty foods on blood cholesterol and the relationship between blood cholesterol levels and diseases of the heart and arteries. The general public has come to associate the term "cholesterol" with these diseases. A number of common food fats and oils and some other forms of fatty substances are being offered to the general public as being of value in the control or reduction of blood cholesterol levels and for the prevention or treatment of diseases of the heart or arteries.

(b) The role of cholesterol in heart and artery diseases has not been established. A causal relationship between blood cholesterol levels and these diseases has not been proved. The advisability of making extensive changes in the nature of the dietary fat intake of the people of this country has not been demonstrated.

(c) It is therefore the opinion of the Food and Drug Administration that any claim, direct or implied, in the labeling of fats and oils or other fatty substances offered to the general public that they will prevent, mitigate, or cure diseases of the heart or arteries is false or misleading, and constitutes misbranding within the meaning of the Federal Food, Drug, and Cosmetic Act.

(Sec. 701, 52 Stat. 1055, as amended; 21 U.S.C. 371. Interprets or applies sec. 403 (a), 52 Stat. 1047; 21 U.S.C. 343(a))

Dated: December 7, 1959.

[SEAL] GEO. P. LARRICK,
Commissioner of Food and Drugs.

Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

FROZEN RAW BREADED FISH PORTIONS VOLUNTARY STANDARDS PROPOSED:

Frozen raw breaded fish portions (including raw breaded fish sticks) voluntary grade standards are proposed by the U. S. Bureau of Commercial Fisheries. The regulations are proposed for adoption in accordance with the authority contained in Title II of the Agricultural Marketing Act of August 14, 1956, as amended. Functions under that Act pertaining to fish, shellfish, and any products thereof were transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956.

The proposed standards, if recommended to the Secretary of the Interior for adoption and made effective, will be the first issued by the Department prescribing voluntary grade standards for frozen raw breaded fish portions. The proposed regulations were published in the December 5, 1959, issue of the Federal Register.

The proposed standards include product and grade description; factors of quality, including ascertaining the grade, evaluation of flavor, odor, appearance, absence of defects, and character; definitions and methods of analysis; lot certification tolerances; and score sheet.

The frozen raw breaded fish portions are described as uniformily-shaped unglazed masses of cohering pieces (not ground) of raw fish meat coated with suitable, wholesome batter and breading, at least 3/8-inch thick.

Standards for fried or cooked breaded fish sticks have been in effect for some time.

Treasury Department

FROZEN TROUT FROM JAPAN NOT BEING SOLD AT LESS THAN FAIR VALUE IN U. S.:

The U. S. Department of the Treasury has determined that frozen brook trout from Japan are not being sold in the United States at less than fair value. This was announced in the December 22, 1959, Federal Register. The notice points out that a complaint was received that frozen trout from Japan were being sold to the United States at less than fair value within the meaning of the Antidumping Act of 1921. The ruling as published in the Federal Register of December 22, 1959, follows:

Office of the Secretary

[AA 643.3]

FROZEN TROUT FROM JAPAN

Determination of No Sales at Less Than Fair Value

DECEMBER 11, 1959.

A complaint was received that frozen trout from Japan were being sold to the United States at less than fair value within the meaning of the Antidumping Act of 1921.

I hereby determine that frozen trout from Japan are not being, nor are likely to be, sold in the United States at less than fair value within the meaning of section 201(a) of the Antidumping Act, 1921, as amended (19 U.S.C. 160(a)).

Statement of reasons: It was determined that merchandise similar or identical to the merchandise sold for exportation to the United States was sold for home consumption in Japan in sufficient quantities to form an adequate basis of comparison. The comparison disclosed that purchase price was not less than home market price, after appropriate adjustment for higher costs of packing on sales to the United States.

This determination and the statement of reasons therefor are published pursuant to section 201(c) of the Antidumping Act, 1921, as amended (19 U.S.C. 160(c)).

[SEAL] LAURENCE B. ROBBINS,
Acting Secretary of the Treasury.

Eighty-Sixth Congress

(Second Session)

CONGRESS RECONVENES: The second session of the 86th Congress convened January 6, 1960. The first session adjourned September 15, 1959. All legislation before the House and Senate during the first session remained in its status as of adjournment and is subject to further consideration during the second session. Bills introduced in the first session do not have to be reintroduced. Bills reported out of a committee or passed by one body of Congress remained in status quo and do not have to retrace legislative steps during the second session.

FISH SPAWNING PROTECTION IN SALMON RIVER: S. 2586 (Church and Neuberger), bill pending before the Senate Interstate and Foreign Commerce Committee; introduced in Senate August 24, 1959, during the first session of the 86th Congress. Amendment introduced in Senate January 19, 1960, proposes to further strengthen original bill by prohibiting the licensing of any dam on the Salmon River, Idaho, whether or not such dam would prove more or less restrictive to the passage of salmon than existing down-stream structures; referred to the Committee on Interstate and Foreign Commerce. As amended, the bill would keep the Salmon River open and unobstructed until the fish passage problem has been satisfactorily solved.

INTERSTATE AND FOREIGN COMMERCE COMMITTEE INVESTIGATIONS OF FISHERIES AND RELATED MATTERS: S. Res. 243 (Magnuson), a resolution to authorize the Senate Committee on Interstate and Foreign Commerce to examine, investigate, and make a complete study of several matters, including fisheries and wildlife; referred to the Committee on Interstate and Foreign Commerce; introduced in Senate January 14, 1960.

NATIONAL FISHERIES CENTER: S. 2840 (Beall and Byrd), a bill to create a Federal planning commission to conduct a study of the possible establishment of a National Fisheries Center in the District of Columbia; to the Committee on the District of Columbia; introduced in Senate January 18, 1960.

Also identical bills H. R. 9691 (McMillan), introduced in House January 18; and H. R. 9722 (Aspinall) and H. R. 9727 (Broyhill), both introduced in House January 19, 1960.

OCEANOGRAPHY: H. R. 9361 (Pelly) a bill to advance the marine sciences, to establish a comprehensive 10-year program of oceanographic research and surveys; to promote commerce and navigation, to secure the national defense; to expand ocean resources; to authorize the construction of research and survey ships and facilities; to assure systematic studies on effects of radioactive materials in marine environments; to enhance the general welfare and for other purposes; to the Committee on Merchant Marine and Fisheries; introduced in House January 6, 1960. The bill, titled "The Marine Sciences and Research Act of 1959" provides for a 10-year program relating to objectives expressed in Senate Resolution 136, introduced June 22, 1959, and adopted by Senate July 15, 1959. Identical bill S. 2692, introduced in Senate September 11, 1959.

The bill would authorize the Secretary of the Interior to carry out the following activities: make grants of funds to qualified scientists, research laboratories, or institutions in furtherance of oceanographic studies; initiate and carry out a program for the replacement, modernization, and enlargement in the number of oceangoing vessels used for research, exploration, and surveys of marine resources; construct and operate shore facilities and laboratories to effectively support the vessels provided for in preceding item; cooperate with other agencies and departments in conducting oceanwide surveys; conduct studies concerning the relation of marine life to radioactive elements; conduct studies of the economic and legal aspects of commercial fisheries and the utilization of marine products; request and obtain cooperation from other governmental agencies and several states having an interest in marine sciences; and take such action and carry out other activities which will accomplish the purposes of this Act. For carrying out the provisions of this Act, funds are authorized in addition to other appropriations to the Bureau of Commercial Fisheries during the 10-year period beginning with July 1 of the first fiscal year following approval of this Act by the President. Bill also includes authorizations for work by the Department of Commerce, Department of Health, Education and Welfare, Office of Education, Department of the Navy, National Science Foundation Division of Marine Sciences (established by bill), and Department of the Interior, Bureau of Mines.

SEAWEEDS (GROUND, POWDERED, OR GRANULATED) ON FREE IMPORT LIST: Senate Report No. 1020, Free Importation of Ground, Powdered, or Granulated Seaweeds (January 13, 1960, 86th Congress, 2nd Session, Report from the Committee on Finance to accompany H. R. 5887), 2 pp., printed. Report contains purpose and provisions of the bill, committee recommendations, changes in existing law, and Paragraphs 1540 and 1722 of the Tariff Act of 1930 as amended. Committee encountered no opposition to the bill and recommended passage of the bill.

SHRIMP CONSERVATION CONVENTION WITH CUBA: S. 2867 (Magnuson), a bill to give effect to the Convention between the United States and Cuba for the conservation of shrimp, signed at Havana August 15, 1958; referred to the Committee on Interstate and Foreign Commerce; introduced in Senate January 20, 1960.

TRANSPORTATION POLICIES: S. Res. 244 (Magnuson), a resolution to authorize the Committee on Interstate and Foreign Commerce to examine, investigate, and make a complete study of transportation regulation, Government assistance to transportation, Federal policies on consolidations and mergers in the transportation industry, and other related matters; referred to the Committee on Interstate and Foreign Commerce; introduced in Senate January 14, 1960.

HORS d'OEUVRES AND CANAPES

These canapes suggested by the home economists of the U. S. Bureau of Commercial Fisheries should be appealing, attractive, and appropriate for parties.

GULF COAST SHRIMP BOIL

- 2 pounds packaged (raw, frozen) fully peeled, deveined shrimp
- 3 bay leaves
- 1 tablespoon whole allspice
- 1½ teaspoons crushed red peppers
- 2 teaspoons whole black peppers
- 2 teaspoons whole cloves
- 2 quarts water
- 2 medium onions, sliced
- 6 cloves garlic
- 2 lemons, sliced
- ¼ cup salt

Tie spices in a piece of cheesecloth. To the water add onion, garlic, lemon, salt, and bag of seasonings; bring to a boil. Add shrimp; cover and return to the boiling point. Simmer 3 to 5 minutes, depending on size. Remove from heat and let stand in spiced water for 3 minutes. Drain and chill. Serve garnished with the whole spices and lemon slices. Yield: about 80 spiced shrimp.

TUNA PINEAPPLE DIP

- 1 can (6½ or 7 ounces) tuna
- 1 can (9 ounces) crushed pineapple
- 1 package (8 ounces) cream cheese
- 3 tablespoons pineapple juice
- Dash salt
- Dash nutmeg
- Potato chips

Drain tuna. Flake. Drain pineapple and save liquid. Soften cheese at room temperature. Combine all ingredients except potato chips; blend into a paste. Chill. Serve in a bowl surrounded by potato chips. Makes about 1 pint of dip.

CRAB SALAD IN PUFF SHELLS

- 1 pound crab meat
- 1 cup chopped celery
- 2 teaspoons lemon juice
- 2 teaspoons grated onion
- 2 tablespoons chopped sweet pickle
- ½ teaspoon celery salt
- 1 teaspoon salt
- Dash pepper
- ½ cup mayonnaise or or salad dressing

Remove any shell or cartilage from crab meat. Combine all ingredients. Cut tops from puff shells. Fill each puff shell with approximately 2 teaspoons salad. Makes approximately 3 cups salad or fills 60 puff shells.

PUFF SHELLS

- ½ cup flour
- Dash salt
- ½ cup boiling water
- 2 eggs
- ¼ cup butter or margarine

Sift flour and measure. Add salt and sift again. Combine butter and boiling water in saucepan; melt over low heat. Add flour all at one time and stir vigorously until mixture forms a ball and leaves the sides of the pan. Remove from heat. Add unbeaten eggs, one at a time, beating thoroughly after each addition; continue beating until a stiff dough is formed. Drop by teaspoonfuls on well-greased cooky sheets, 15½ x 12 inches. Bake in a very hot oven, 450° F., for 10 minutes; reduce heat to 350° F., and continue baking about 10 minutes longer. Makes approximately 60 puff shells.

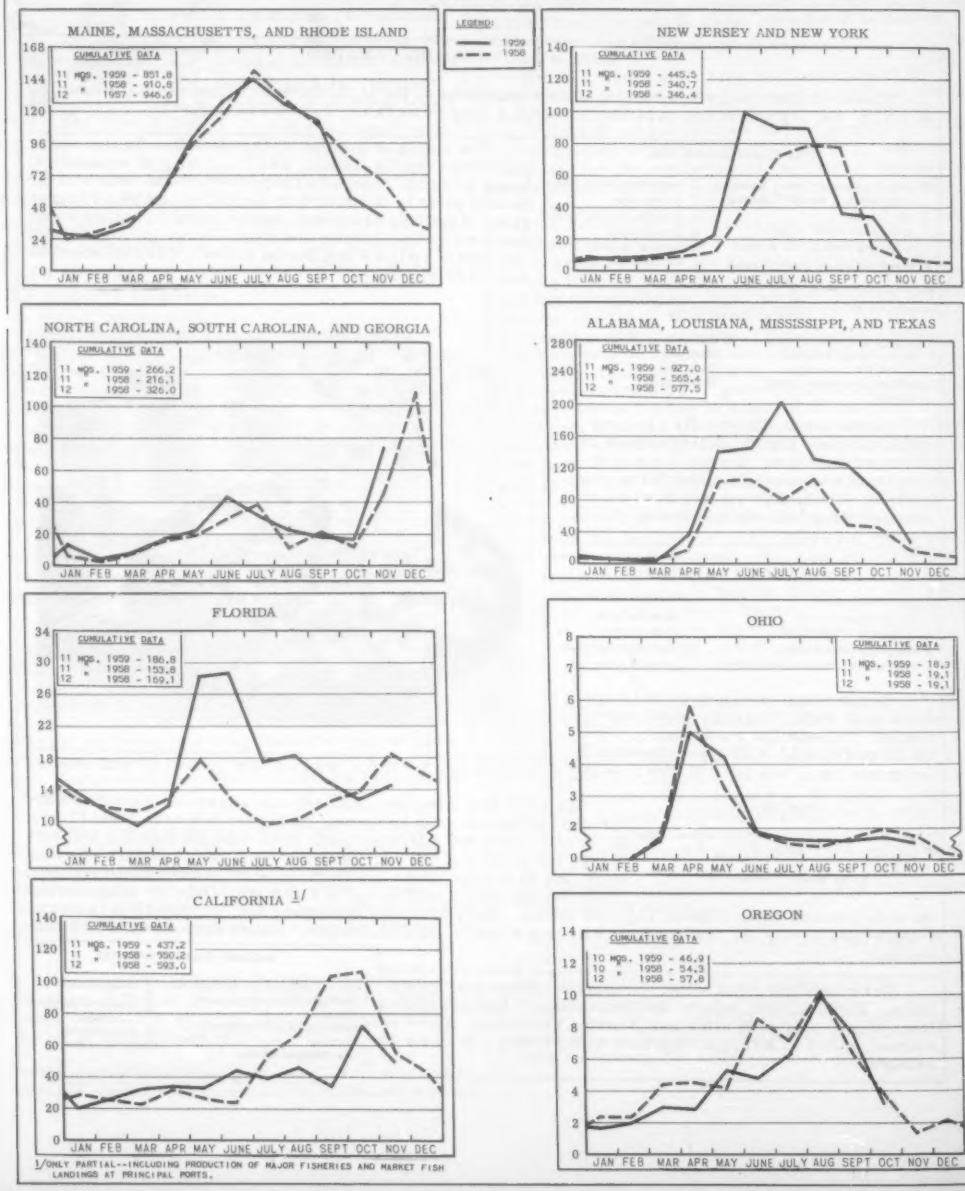
SMOKED SALMON CANAPES

- 1 can (7 ounces) smoked salmon
- 1 package (3 ounces) cream cheese
- 2 tablespoons mayonnaise or dressing
- ½ cup chopped celery
- ¼ teaspoon salt
- ¼ teaspoon prepared mustard
- 16 slices bread
- Chopped parsley

Drain fish and grind twice. Cream the cheese and mayonnaise. Blend in fish, celery, and seasonings. Remove crusts from bread. Cut each slice into 3 strips and toast. Spread salmon on toast strips. Garnish with parsley. Makes 48 canapes.

CHART 1 - FISHERY LANDINGS for SELECTED STATES

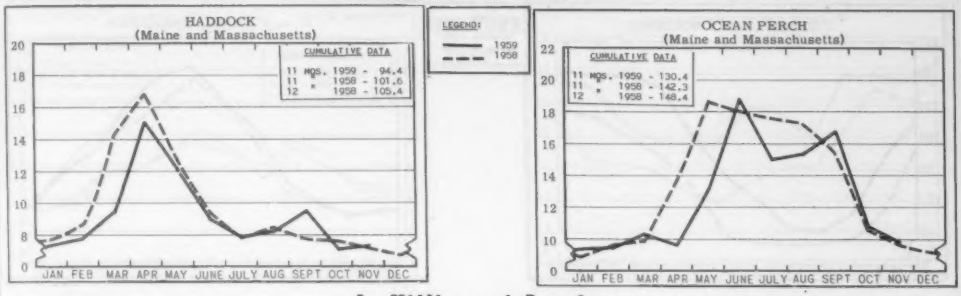
In Millions of Pounds



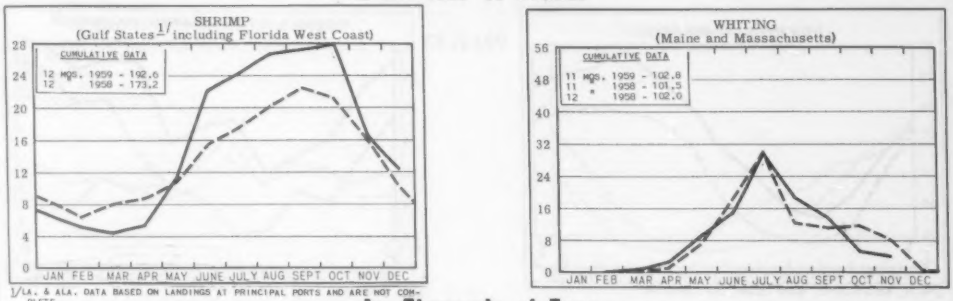
1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

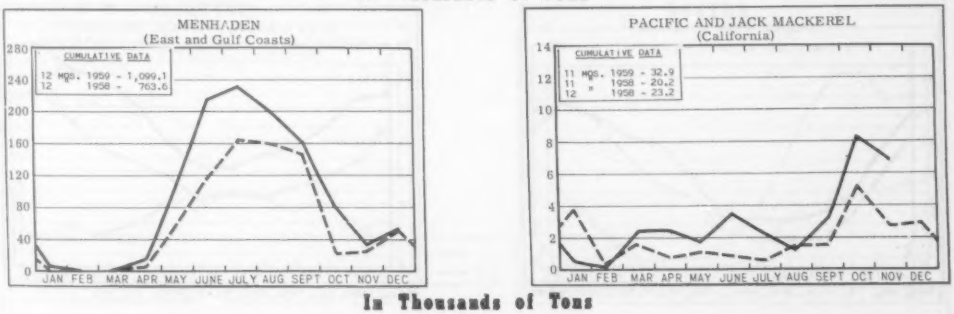


In Millions of Pounds



1/ LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



In Thousands of Tons

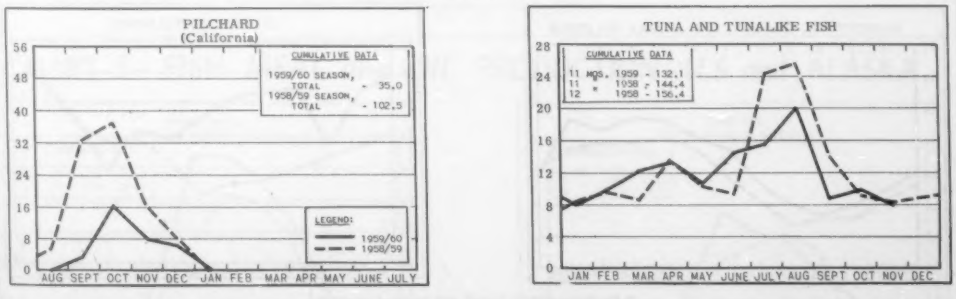
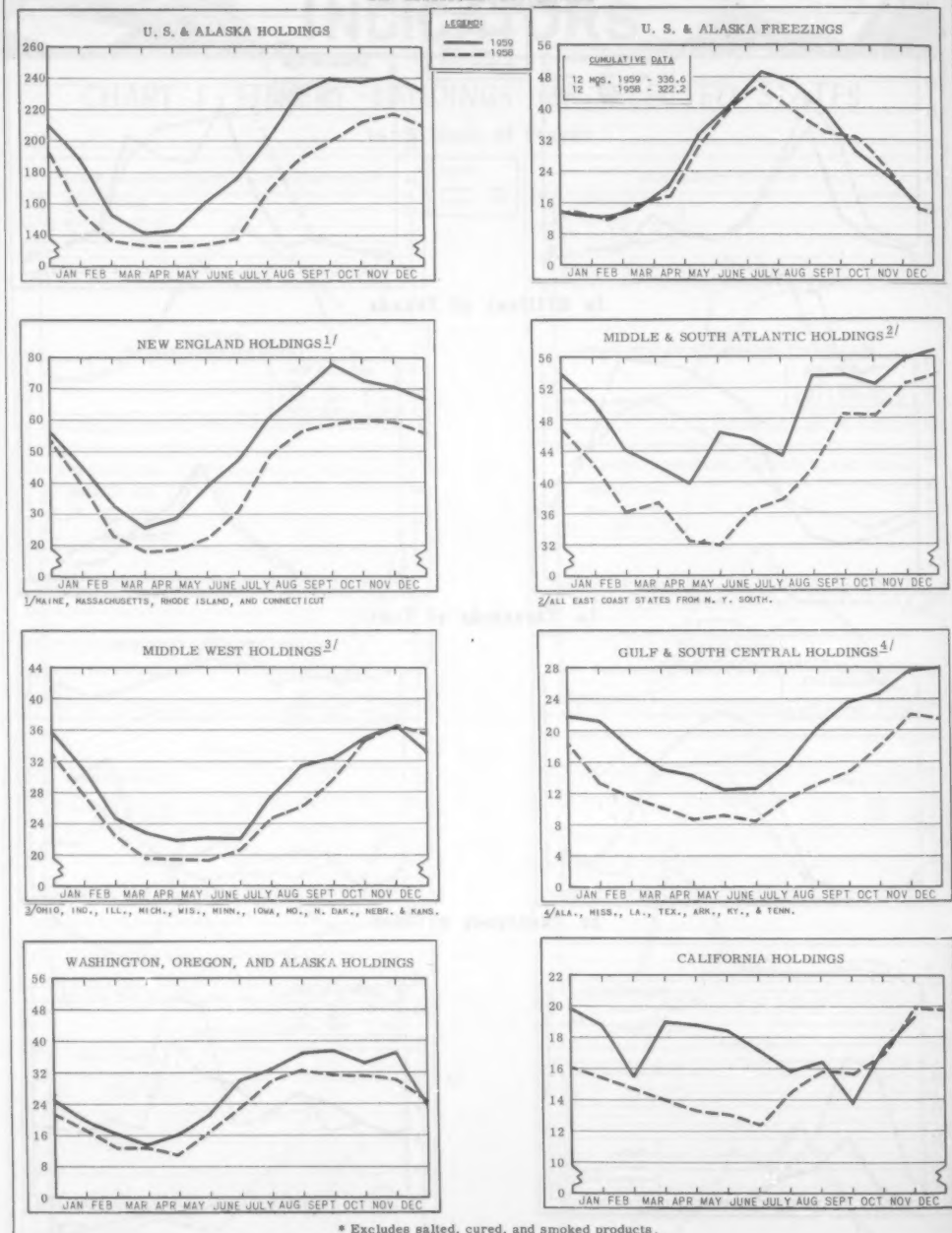


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds



1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT

2/ALL EAST COAST STATES FROM N. Y. SOUTH.

3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ALA., MISS., LA., TEX., ARK., KY., & TENN.

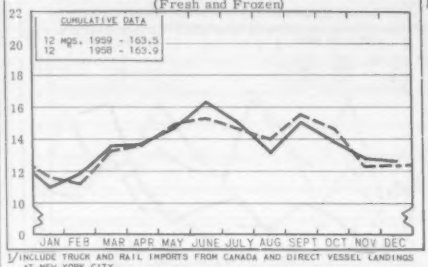
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

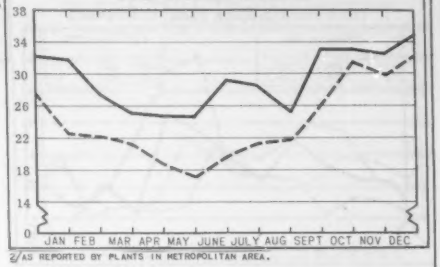
NEW YORK CITY

RECEIPTS[1] AT WHOLESALE SALT-WATER MARKET (Fresh and Frozen)



1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

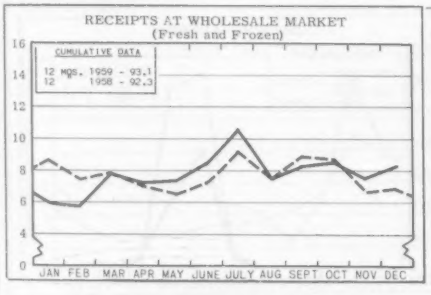
COLD-STORAGE HOLDINGS[2]



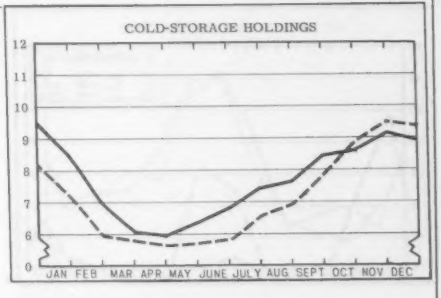
2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHICAGO

RECEIPTS AT WHOLESALE MARKET (Fresh and Frozen)

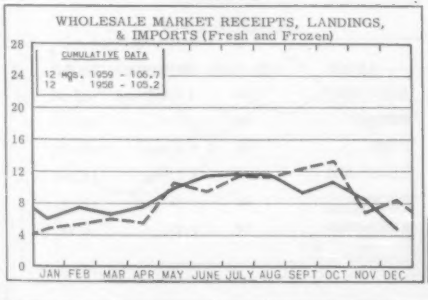


COLD-STORAGE HOLDINGS



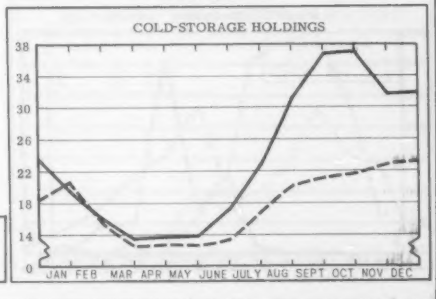
SEATTLE

WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (Fresh and Frozen)



BOSTON

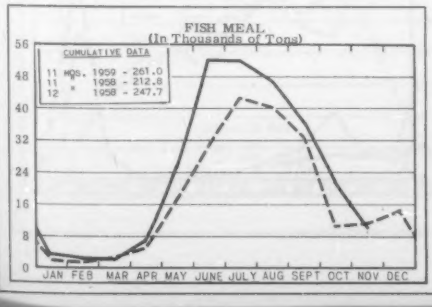
COLD-STORAGE HOLDINGS



LEGEND:
1959
1958

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

FISH MEAL
(In Thousands of Tons)



FISH OIL
(In Millions of Gallons)

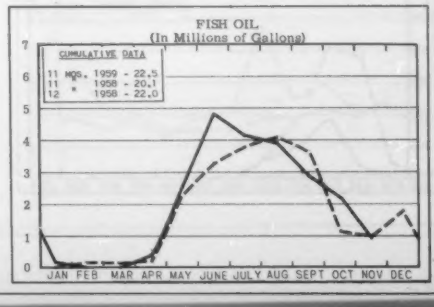
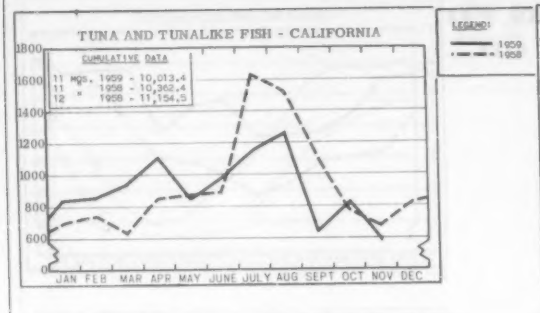
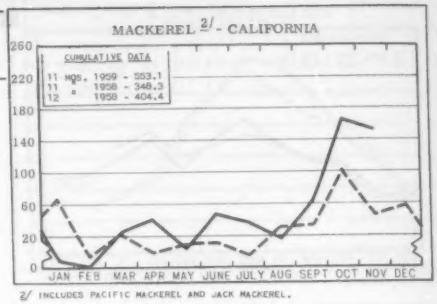


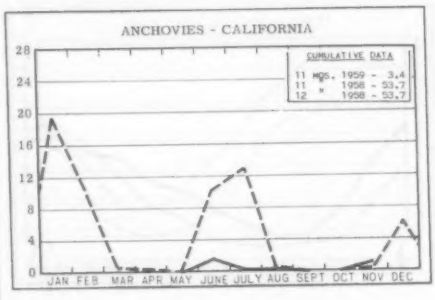
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

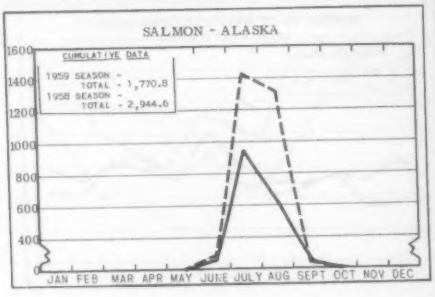
In Thousands of Standard Cases

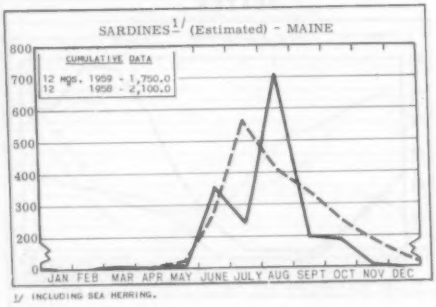




2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.



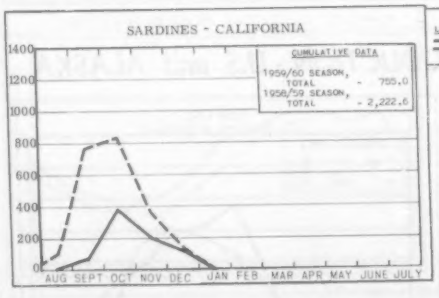


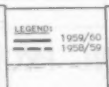


1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# ½ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	½-lb.	8 oz.





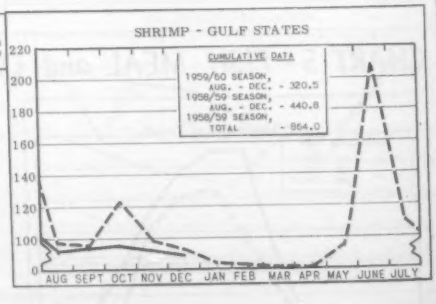
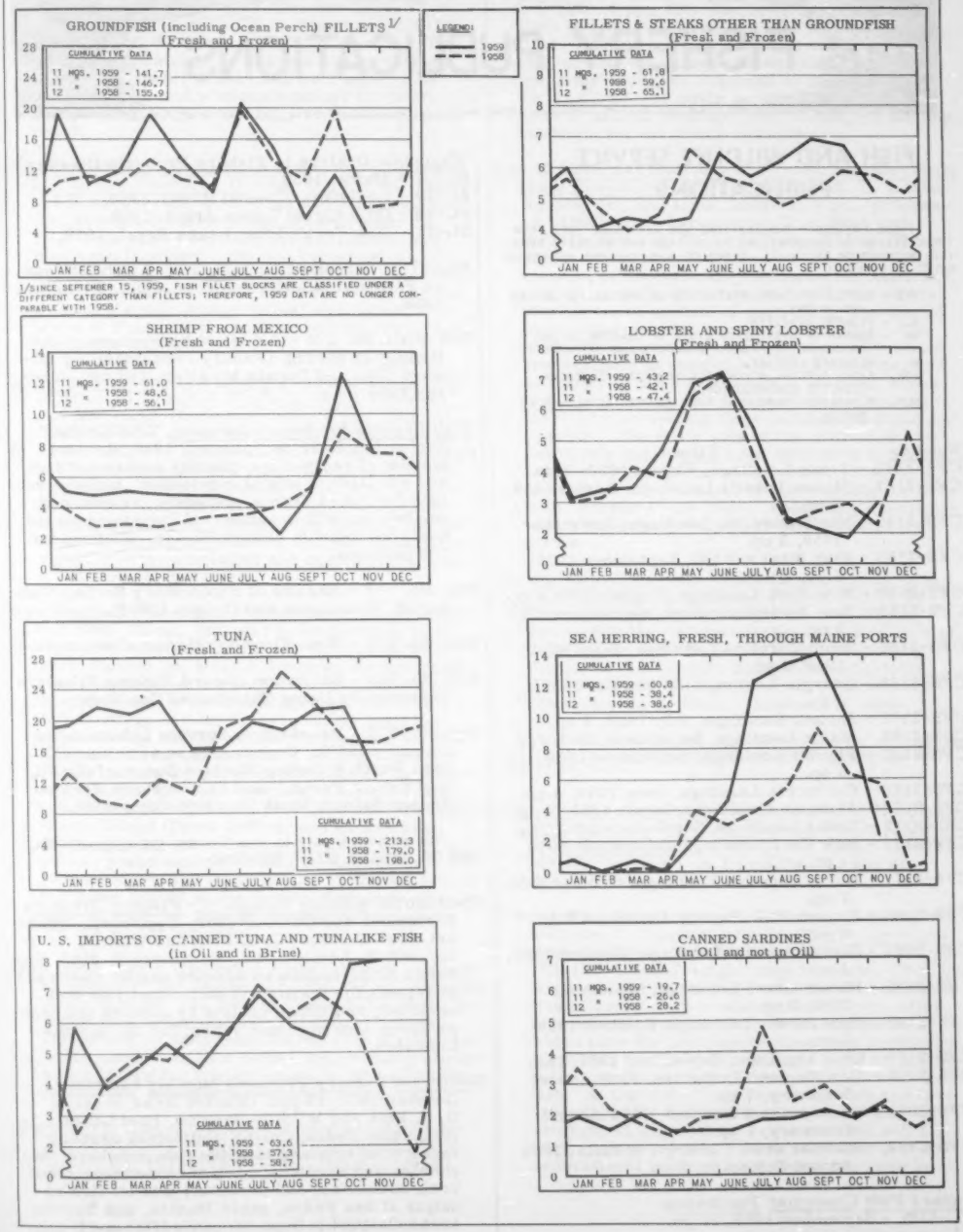


CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - BRANCH OF STATISTICS LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
WL - WILDLIFE LEAFLET.
SSR - FISH. SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title

CFS-2144 - Texas Landings, August 1959, 3 pp.
CFS-2147 - Massachusetts Landings, August 1959, 5 pp.
CFS-2149 - North Carolina Landings, September 1959, 3 pp.
CFS-2153 - Fish Meal and Oil, September 1959, 2 pp.
CFS-2158 - New York Landings, August 1959, 4 pp.
CFS-2159 - New Jersey Landings, September 1959, 3 pp.
CFS-2161 - South Carolina Landings, September 1959, 2 pp.
CFS-2162 - Georgia Landings, September 1959, 2 pp.
CFS-2163 - Shrimp Landings, July 1959, 6 pp.
CFS-2166 - Maine Landings, September 1959, 3 pp.
CFS-2167 - Florida Landings, September 1959, 6 pp.
CFS-2169 - California Landings, June 1959, 4 pp.
CFS-2170 - Alabama Landings, August 1959, 2 pp.
CFS-2172 - Texas Landings, September 1959, 3 pp.
CFS-2173 - New York Landings, September 1959, 4 pp.
CFS-2177 - North Carolina Landings, October 1959, 3 pp.
CFS-2180 - Frozen Fish Report, October 1959, 8 pp.
CFS-2181 - South Carolina Landings, October 1959, 2 pp.
CFS-2185 - Rhode Island Landings, September 1959, 3 pp.
CFS-2187 - New Jersey Landings, October 1959, 3 pp.
CFS-2197 - Ohio Landings, September 1959, 2 pp.
CFS-2202 - New England Fisheries, 1958 Annual Summary, 7 pp.
CFS-2203 - Chesapeake Fisheries, 1958 Annual Summary, 7 pp.
CFS-2204 - Manufactured Fishery Products, 1958 Annual Summary, 7 pp.

Canned Fish Consumer Purchases:
FL-478k - September 1959, 31 pp.

Wholesale Dealers in Fishery Products (Revised):
SL- 1 - Maine, 1959.
SL-19 - Louisiana (Coastal Area), 1959.
SL-29 - Ohio (Great Lakes Area), 1959.
SL-31 - New York (Great Lakes Area), 1959.

WL-379 - Suggested List of Printed Publications on Fish and Wildlife Subjects, 2 pp., November 1958.

SSR-Fish. No. 276 - A List of References on the Biology of Shrimp (Family Penaeidae), by Edward Chin and Donald M. Allen, 146 pp., January 1959.

Fish Recipes for School Lunches, Test Kitchen Series No. 5, 27 pp., printed, 1959 (Revised). A booklet of recipes for quantity cookery of fish and shellfish in school cafeterias. Includes recipes for baked dishes, chowders, salads, and sandwiches with a number of variations on the basic ingredients of each recipe. Planned for 100 portions.

Sep. No. 574 - Results of Exploratory Shrimp Fishing off Washington and Oregon (1958).

Sep. No. 575 - Fish Flour for Human Consumption.

Sep. No. 576 - Sanitation Aboard Fishing Trawlers Improved by Using Chlorinated Sea Water.

Sep. No. 577 - Research in Service Laboratories (January 1960): Contains these articles--"Ocean Perch Filleting Machine Successfully Fillets Yellow Perch," and "Laboratory Work on Frozen Salmon Steak Standard Completed."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary - Fishery Products, September and October 1959; 7 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 400 E. Lombard St., Baltimore 2, Md.) Receipts at Baltimore by species and by states and provinces for fresh- and salt-water fish and shellfish; and total receipts by species and comparisons with previous years; for the months indicated.

California Fishery Products Monthly Summary, October 1959, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel, anchovies and sardines; pack of canned tuna, mackerel, anchovies, and sardines; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen

shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the month indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, October 1959, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, October 1959, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; sponge sales; and fishery imports at Port Isabel and Brownsville, Tex., for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, November 1959, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, October 1959, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for September 1959, 22 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the month indicated.

(New York) List of Primary Brokers and Importers of Fishery Products and Byproducts, New York City, 1959-1960, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.)

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, October 1959, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria, (Ore.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

Use of Chemical Barriers to Protect Shellfish Beds from Predators, by V. L. Loosanoff, C. L. MacKenzie, Jr., and L. W. Shearer, 9 pp., processed. (Biological Laboratory, U. S. Fish and Wildlife Service, Milford, Conn., 1959.) This paper, which was presented at the July 1959 meeting of the National Shellfisheries Association, describes new, cheap, simple, but effective chemical method of controlling enemies of mollusks grown for human consumption. The method and its ramifications and modifications are designed to control boring gastropods, such as oyster drills and Polinices, starfish, crabs, and other enemies of commercial mollusks, primarily by preventing their invasion of shellfish grounds. The basic idea of the method is comparatively old, having been advocated and developed by the senior author since 1946. It is founded on the principle of surrounding the beds with "barriers" or "belts" containing chemicals which either stop, repel, or kill undesirable forms.

On the Identification of Chum Salmon Stocks in the North Pacific by Means of Scales, Part 1, by Tetsuo Kobayashi and Shin-ichi Abe, 34 pp., processed, limited distribution. (Translation of INPFC Doc. 207, Hokkaido Salmon Hatchery, August 1958.) Pacific Salmon Investigations, U. S. Fish and Wildlife Service, 2725 Montlake Blvd., Seattle 2, Wash., October 17, 1958.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Fauna of the Aleutian Islands and Alaska Peninsula, with Notes on Invertebrates and Fishes Collected in the Aleutians, 1936-38, by Victor B. Scheffer, North American Fauna No. 61, 420 pp., illus., printed, $1.25.

"Food-Fish Farming in the Mississippi Delta," by Malcolm C. Johnson, article, The Progressive Fish-Culturist, vol. 21, no. 4, October 1959, pp. 154-160, printed, single copy 25 cents. Presents the novel but potentially lucrative idea of rotation of crops of rice with crops of fish. After several crops of rice have been harvested by which time the land has become less productive, the fields are flooded to a depth of 18 inches or more with fingerling catfish, bass, or buffalofish. At the end of two years, the fish are harvested and the fields replanted with rice. Advantages of this system are increased soil fertility, increased rice yields, cash fish crops, recreational value, a long-range increase in

human food, and soil that doesn't blow away while it is lying fallow. The U. S. Fish and Wildlife Service is a sponsor of an experiment station to be built in Arkansas to assist farmers in refining and standardizing techniques in this type of pond fishery.

Food of the Squawfish PTYCHOCHEILUS OREGONENSIS (Richardson) of the Lower Columbia River, by Richard B. Thompson, Fishery Bulletin 158 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 60), 20 pp., illus., printed, 20 cents, 1959.

Vertical Distribution of Pelagic Fish Eggs and Larvae Off California and Baja California, by Elbert H. Ahlstrom, Fishery Bulletin 161 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 60), 44 pp., illus., printed, 35 cents, 1959.

MISCELLANEOUS PUBLICATIONS

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ALGAE:

The Marine Algae of the Labrador Peninsula and Northwest Newfoundland (Ecology and Distribution), by Robert T. Wilce, Bulletin No. 158, 107 pp., illus., printed, C$1.50. National Museum of Canada, Department of Northern Affairs and National Resources, Ottawa, Canada, 1959.

Some Features of Marine Algal Distribution in Norway, by T. Braarud (Reprinted from Acta Adriatica, vol. VIII, No. 15, 8 pp., printed in English with summary in Serbo-Croatian. Institut za Oceanografiju i Ribarstvo, Split, Jugoslavia, 1958.

ANTIBIOTICS:

"Antibiotic Residues in Fish Iced with Chlortetracycline Ice and Effect of Normal Cooking Procedures on These Residues," by J. W. Boyd, B. A. Southcott, and H. L. A. Tarr, article, Antibiotics Annual, 1956-1957, pp. 1002-1005, printed. Antibiotics Annual, 1956-1957, Medical Encyclopedia, Inc., 30 E. 60th St., New York 22, N. Y.

"The Use of Antibiotics for the Control of Spoilage in the East Coast Fisheries. Part 1--Introduction and the Use of Antibiotics in Gutted Cod and Haddock Aboard Trawlers," by C. H. Castell and M. F. Greenough, article, Canadian Fisherman, vol. 45, no. 10, October 1958, pp. 6-8, printed. Canadian Fisherman, National Business Publications, Ltd., Gardenvale, Quebec, Canada.

"The Use of Antibiotics for the Control of Spoilage in the East Coast Fisheries. Part 2--The Effect of Antibiotics on the Keeping Time of Fillets," by C. H. Castell and M. F. Greenough, article, Canadian Fisherman, vol. 45, no. 11, November 1958, pp. 20-22, printed. Canadian Fisherman, National Business Publications, Ltd., Gardenvale Quebec, Canada.

AUSTRALIA:

Australian Journal of Marine and Freshwater Research, vol. 10, no. 2, October 1959, 143 pp., illus., printed. Australian Journal of Marine and Freshwater Research, Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C. 2, Australia. Features, among others, articles on: "The Naturalization of the Pacific Oyster in Australia," by J. M. Thompson; and "The Status of the School Shark Fishery in South-Eastern Australian Waters," by A. M. Olsen.

The Freshwater Fishes of New South Wales, by John S. Lake, Research Bulletin No. 5, 25 pp., illus., printed. State Fisheries, Chief Secretary's Department, New South Wales, Sydney, Australia, 1959.

The Status of the East Gippsland Bream Fishery, by John K. Ling, Fisheries Contribution No. 8, 20 pp., illus., processed. Fisheries and Game Dept., 605 Flinders St., Melbourne C. 3, Australia, November 1958.

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Progress Reports of the Atlantic Coast Stations, no. 72, 39 pp., illus., printed in French and English. Queen's Printer and Controller of Stationery, Ottawa, Canada, September 1959. Contains, among others, these articles: "Growth and Parasites of Cod during a Year in Captivity," by A. C. Kohler; "Constituents of Salt Cod Pickle," by F. W. van Klaveren and E. Vaillancourt; "Squid Inshore in Newfoundland and on the Grand Bank, 1953 to 1958," by H. J. Squires; "Drift-Netting for Herring along the South Coast of Newfoundland," by S. N. Tibbo; and "Fat Hydrolysis in Frozen Fish. 2--Relation to Protein Stability," by Doris I. Fraser and W. J. Dyer.

Summary Report on Fishery Investigations and Groundfish Landings in Newfoundland during 1957, by A. M. Fleming and Marjorie E. Prouse, Circular No. 5, 41 pp., processed. Fisheries Research Board of Canada, Biological Station, St. John's, Newfoundland, 1958.

Variations dans le Quebec de l'Abondance Annuelle des Poissons Originaires des Grands-Lacs (Variations in Quebec in the Annual Abundance of Fishes Originating in the Great Lakes), by Vadim D. Vladykov and G. Beaulieu, Contribution No. 70, 9 pp., illus., printed in French. (Reprinted from Le Naturaliste Canadien, vol. LXXXV, Nos. 6-7, June-July 1958.) Department of Fisheries, Rm. 127, E. Bldg., Quebec, Canada.

COLD STORAGE:

"Studies on the Discoloration in Fish Meat during Freezing Storage. I--A Spectrophotometric Method for the Simultaneous Determination of Ferrous and Ferric Forms of Myoglobin in Their Mixed Solution," by Y. Sano and K. Hashimoto, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 6-7, 1958, pp. 519-523, illus., printed in Japanese with

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English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

"Studies on Muscle of Aquatic Animals. XXXIX--Changes in Muscle of Yellowtail (Seriola quinqueradiata) during Cold Storage," by U. Simidu, H. Terashima, and W. Simidu, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 6-7, 1958, pp. 586-590, illus., printed in Japanese with English summary. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

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Summary Report on the Indian Fishery at Celilo Falls and Vicinity, Columbia River, 1947-1954, 25 pp., illus., processed. Corps of Engineers, U. S. Army, Portland, Ore., August 1955.

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ELECTRICAL FISHING:

"Erfahrungen uber Leitfahigkeitsmessungen und Hartebestimmungen im Rahmen der Elektrofischerei und Gewasserbonitierung" (Experience in Measuring the Conductivity and Determining the Hardness of Water in Connection with Electrofishing and Evaluation of Water), by G. Buhse, article, Der Fischwirt, vol. 8, no. 6, pp. 160-161, printed in German. Deutscher Fischerei-Verband, Neuerwall 72, Hamburg 36, W. Germany.

"Gefahren und Schutzmassnahmen bei der Elektrofischerei" (Dangers and Protective Measures in Electrofishing), by A. Hosl, article, Der Fischwirt, vol. 8, no. 1, January 1958, pp. 16-18, printed in German. Deutscher Fischerei-Verband, Neuerwall 72, Hamburg 36, W. Germany.

"Neuartige Thunfischangel in der Elektrofischerei" (New Type of Tuna Hook in Electrofishing), by K. Schultz, article, Schiff und Hafen, vol. 10, no. 9, September 1958, pp. 752-754, printed in German. C. D. C. Heydorns Buchdruckerei, Uetersen bei Hamburg, W. Germany.

"Vorschriften fur die Errichtung und den Betrieb von Elektrofischereianlagen in Binnengewassern" (Regulations for the Installation and Operation of Electrical Fishing Gear in Freshwater Areas), article, Allgemeine Fischerei Zeitung, vol. 83, no. 15, August 1958, pp. 293-294, printed in German. Bayer, Landwirtschaftsverlag, G. m. b. H., Marsstrasse 22, Munich 2, W. Germany.

FATTY ACIDS:

Nutritive Value of Highly Unsaturated Fatty Acids and the Origin of Toxicity of Fish Oils, by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 11 pp., illus., printed in Japanese with English abstract. (Reprinted from Journal of Japanese Society of Food and Nutrition, vol. 7, no. 4, December 1954, pp. 1-10.) Chas. E. Tuttle Co., 28-30 So. Main St., Rutland, Vt.

Nutritive Value or Toxicity of Highly Unsaturated Fatty Acids. I, by Takashi Kaneda and Seinosuke Ishii, 9 pp., illus., printed. (Reprinted from The Journal of Biochemistry, vol. 41, no. 3, 1954, pp. 327-335.) Department of Biochemistry, Faculty of Medicine, Tokyo University, Bunyo-ku, Tokyo, Japan.

Nutritive Value or Toxicity of Highly Unsaturated Fatty Acids. II, by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 13 pp., illus., printed. (Reprinted from The Journal of Biochemistry, vol. 42, no. 5, 1955, pp. 561-573.) Department of Biochemistry, Faculty of Medicine, Tokyo University, Bunyo-ku, Tokyo, Japan.

Studies on the Nutritive Value of Lipides. XII--Nutritive Value or Toxicity of Highly Unsaturated Fatty Acids (3), by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 8 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, no. 7, November 1954, pp. 658-663.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

FISH CULTURE:

Trout and Salmon Culture (Hatchery Methods), by Earl Leitritz, Fish Bulletin No. 107, 169 pp., illus., printed, $2. Printing Division, Documents Section, North Seventh St. at Richards Blvd., Sacramento 14, Calif., 1959. A practical handbook for acquainting the new hatchery employee with the rudiments of fish culture, and also to serve as a reference for experienced personnel. "During the past 10 or 12 years, applied science and mechanics have revolutionized fish hatchery operations," asserts the author. This text describes such advances as the uses of new chemicals in treating diseases in hatcheries, eradicating undesirable fish populations, artificial spawning, new methods of transporting fish and eggs, and the employment of labor-saving devices such as fish loaders, self-graders, incubators, and dry feeds.

FISH LIVER OILS:

Studies on the Nutritive Values of Lipids. IX--Nutritive Value of Polymerized Liver Oil of Dog Fish, by Takashi Kaneda and Kimie Arai, 4 pp., printed in Japanese with English summary. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 19, no. 5, 1953, pp. 700-702.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

FISH MEAL:

"Screening Before Milling of Fish Meal Reduces the Proportion of Fine Particles, by R. M. Duncan, article, Food Industries of South Africa, vol. 12, no. 3, August 1958, pp. 24-26, printed. Food Industries of South Africa, P. O. Box 4245, Cape Town, Union of South Africa.

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"Tests Show Bulk Storage of Fish Meal Successful," article, Feedstuffs, vol. 30, no. 32, August 1958, p. 78, printed. Feedstuffs, Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis 5, Minn.

FISH OILS:

"Los Aceites de Pescado en la Industria de Pinturas--I" (Fish Oils in the Painting Industry--Parts I and II), by J. Huesa Lope, article, Grasas y Aceites, vol. 8, no. 5, 1957, pp. 226-229, printed in Spanish. Instituto de la Grasa y sus Derivados, Avenida de Heliopolis, Sevilla, Spain.

Nutritive Value or Toxicity of Oils of Salted and Dried Fishes, by Takashi Kaneda, Hisae Sakai, and Seinosuke Ishii, 7 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, no. 7, 1954, pp. 664-669.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori, 6-Chome, Tokyo, Japan.

Studies on the Polymerization and Oxidation of Marine Animal Oils. I--Preparation of Edible Oil from Marine Animal Oils, by Hideo Higashi, Shigeo Murayama, and Kikuko Tabei, 14 pp., illus., printed in Japanese with English summary. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 19, no. 4, 1953, pp. 537-550.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

FISHERIES MANAGEMENT:

Biological and Economic Aspects of Fisheries Management, edited by James A. Crutchfield, 166 pp., processed. University of Washington, Seattle, Wash. Proceedings of a conference on biological and economic aspects of fisheries management held under the auspices of the College of Fisheries and the Department of Economics of the University of Washington at Seattle, February 17-19, 1959. Economists, fisheries biologists, and members of the commercial fishing industry attended the sessions. The report, which contains the papers delivered and summary notes of the discussions, faithfully describes the transactions.

After a brief discussion of the background for the conference, it launches immediately into the topics of the various sessions which covered: (1) biological and economic aspects of fishery management; (2) halibut fishery management; (3) salmon management in Alaska; and (4) international trade policies and their relation to fisheries. At times the discussions became very lively. As a result much thought-provoking information is set down. Such factors are covered as the effect of management regulations on the conduct of efficient operations in managed fisheries, the need to limit entry of individuals into certain fisheries, the effect of certain controls on processing and marketing operations, the effect of certain types of controls on costs and profits in the industry, etc.

An address entitled "Canada and the Abstention Principle," by Honorable James Sinclair, former Canadian Minister of Fisheries, is also included in the report. Sinclair's remarks on this important subject are very penetrating.

--W. H. Stolting

FLOATING TRAWLS:

"Entwicklungsstand und Einsatzbedingungen Pelagischer Schleppnetze" (State of Development and Working Conditions of Floating Trawls), by G. Kajewski, article, Fischereiforsching, vol. 1, no. 1, August 1958, pp. 1-4, printed in German. Institut fur Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, E. Germany.

FOOD AND AGRICULTURE ORGANIZATION:

La Peche en Italie et la Distribution du Poisson (The Italian Fishery and the Distribution of Fish), by Paolo Pagliazzi, Technical Paper No. 60, 2 pp., processed in French. General Fisheries Council for the Mediterranean, Food and Agriculture Organization of the United Nations, Rome, Italy.

La Preparation des Catalogues des Noms de Poissons et la Methode de la Geographie Linguistique (The Preparation of Catalogs of Fish Names and the Linguistic Geography Method), by Vojmir Vinja, Technical Paper No. 55, 6 pp., processed. General Fisheries Council for the Mediterranean, Food and Agriculture Organization of the United Nations, Rome, Italy, 1958.

The State of Food and Agriculture, 1959, 206 pp., illus., printed, US$2. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.) Reviews the world food and agriculture situation during the year ended June 30, 1959, with particular emphasis on the underdeveloped nations. Includes a short section on fishery production which notes that the world catch for 1958 was considerably higher than in 1957. A slightly longer section on fishery policies mentions international conferences concluded or ratified during 1958/59, government assistance to fisheries, and utilization of fishery resources in less-developed countries.

Yearbook of Fishery Statistics, 1958 (Production and Fishing Craft), vol. IX, 454 pp., illus., processed in English, French, and Spanish, $4. Food and Agriculture Organization of the United Nations, Rome, Italy, 1959. (Sold in United States by Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.) As in previous years, this edition contains fishery statistics on catches, production of preserved and processed commodities, fishing craft, and whaling from all countries. The maps and graphs section of the Yearbook has been further expanded by the addition of diagrams showing the world catch by continents and the catches of the larger producing countries for a number of years. The total world catch of fishery products for 1958 is estimated at 33.7

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million metric tons compared with 30.6 million tons for 1957.

GEAR:

"A Simple Rig for Multiple Trolling with Reels and Wire Lines," by W. A. King-Webster, article, World Fishing, vol. 8, no. 11, November 1959, pp. 25-26, 60, illus., printed. Outlines a new type of gear being tested in trolling for pelagic fish by the Trinidad Fisheries Department. This method utilizes a high speed manual reel attached to a bamboo outrigger, enabling one vessel to operate many more lines simultaneously than was previously possible by hand hauling.

GENERAL:

Seefischerei in Gegenwart und Zukunft (Sea Fishing Now and in the Future), by C. Birkhoff, 153 pp., illus., printed in German. Nordwestdeutscher Verlag Ditzen und Co., Bremerhaven, W. Germany, October 1957. Deals with the problems, methods, and vessels of the world fishing industry together with a dictionary of fishery technological terms. Topics covered include: the sea, the source of food of the future; necessity of extension of our fish catching areas; fish catching with traps and stationary nets; line and hook fishing; cutter, seine net, tuna, and drift-net fishing; trawling, both side and stern; whaling; catching equipment and methods of tomorrow; and the floating trawl. Also contains information on: electrofishing; fish detection; the history of factoryships; factory trawlers and motherships; operation of a fishing fleet; fish harbors; from catching to consumption; and the future of fishing.

HALIBUT:

Halibut--Observations on its Size at First Maturity, Sex Ratio and Length/Weight Relationship, by Bennet B. Rae, Scottish Home Department Marine Research No. 4, 1959, 19 pp., illus., printed, 7s. 6d. (about US$1.05). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland. Investigations on commercial and research vessels in the North Atlantic have shown that male halibut normally spawn for the first time at sizes ranging from 28 to 40 inches and females from 39 to 54 inches. Spawning takes place mainly in April and May but evidence of an earlier spawning, based on the occurrence of well developed roes in fish caught in December 1952, is discussed. In the early years of the halibut's life, male and female fish are present in equal numbers but with increasing age and size the females outnumber the males and all the large fish of 60 inches and over were found to be females. The length/weight relationship is studied. Halibut of the same length may vary greatly in weight. This is due to various factors including anatomical, seasonal, and regional differences. The significance of these results is considered in relation to the halibut fisheries, and the need for conservation of such a valuable resource is noted.

HERRING:

Prospects for the 1959-60 British Columbia Herring Fishing Season, by F. H. C. Taylor, Circular No. 53, 4 pp., processed. Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, October 1959. The fifteenth in a series of annual circulars dealing with the prospects of the British Columbia herring fishery. These forecasts are made to aid in the formation of effective management policies and to help the industry use the resources more economically. The data are derived from prediction of the carry-over from the estimated abundance in the previous season and the expected new recruitment.

IDAHO:

Statewide Fishing Harvest Survey, 1957, by Forrest R. Hauck, Federal Aid to Fisheries Project F18-R-4, 11 pp., processed. Department of Fish and Game, Boise, Idaho, August 15, 1958.

INTERNATIONAL GEOPHYSICAL YEAR:

"The IGY World Data Centers for Oceanography," by J. R. Lumby, article, Texas Journal of Science, vol. XI, no. 3, September 1959, pp. 259-269, illus., printed, single copy $1.25. Texas Journal of Science, Box 7984, University Station, Austin, Tex.

JAPAN:

Bulletin of Tokai Regional Fisheries Research Laboratory, no. 24, June 1959, 91 pp., illus., printed in Japanese with English summaries. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan. Includes, among others, these articles: "Some Studies on Set Net Fishing Ground," by M. Nomura; "Studies on Trawl Net. III--Observation of the Configuration of a Trawl Net Using a Large Sized Model," by S. Takayama, T. Koyama, and H. Taketomi; and "Prevention of the Adhesion of Canned Salmon Meat," by T. Takahashi and M. Takei.

Collected Reprints, 1958 (from the Tokai Regional Fisheries Research Laboratory), 251 pp., illus., printed in Japanese with English summaries. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan. Contains, among others, these reprints of articles published by Laboratory scientists outside the publications of the Laboratory: "Fluctuations in the Fishery for Young Sardine off Shichiri-Mihama, Kii Peninsula (One of the Data Relevant to Fluctuations of the Sardine Stock in Japanese Waters)," by Z. Nakai; "A Trial on Estimating the Abundance of Population of the Pacific Saury, Cololabis saira (Brevoort)" and "On the Availability of the Sardine, Sardinops melanosticta, Population Caught by Drift Gill Nets in the Western Japan Sea," by T. Doi; "An Attempt for Determining the Swimming Speed of Fish Schools by the Fish Finder (Preliminary Report)," by S. Kawada, Y. Tawara, and C. Yoshimuta; "An Attempt for Detecting the Swimming Course of Fish Schools at a Set Net Fishing Ground by Fish Finder (Preliminary Report)," by S. Kawada and Y. Tawara; "On the Change in Strength of Netting Cords Immersed in the Sea. II--Relation Between the Strength of Tarred Synthetic Cords and the Temperature, and Comparison of Power of These Cords Changing When

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Immersed in the Sea," by Y. Shimozaki and Y. Nozawa; "On the Nature of the Streaming Birefringence Observed in the Aqueous Extracts of Squid Muscle. II--Dissolution of 'Myosins' in the Aqueous Extract," by M. Migita and J. J. Matsumoto; "On Purified M-Actomyosin of Squid Muscle," "Some Notes on M-Actomyosin of Squid Muscle," "On Actomyosin of Squid Muscle from Salt-Extract. Preparation of Actomyosin," "On the Protein Composition of Squid Muscle," and "The Effect of ATP on the Viscosity of Squid Actomyosin," by J. J. Matsumoto; "On a Specific Behavior of 'Myosins' of Squid Muscle. I--Precipitability of 'Myosins'," by M. Migita and others; "Influence of Urea upon the Binding of Some Ionic Dyes to Proteins," by M. Migita and S. Otake; "A Comparative Study on the Extractability of Muscle Proteins of Some Animals," by M. Migita, J. J. Matsumoto, and N. Aoe; "Study on the Green Meat of Tuna. I--Quantitative Differences of Vitamin B Group and Minerals Between the Green and the Normal Meat of Precooked Tuna," "Study on the Green Meat of Tuna. II--Quantitative Differences of Vitamin B Group and Minerals in Kidney Between Green and Normal Bodies of Yellowfin Tuna," and "Study on the Green Meat of Tuna. III--A Simple Method to Distinguish Greened Body from Normal One Before Cooking," by S. Hirao and others; "The Pantothenic Acid Content of Fish and Shellfish" and "The Folic Acid Content of Fish and Shellfish," by H. Higashi and others; "Fat and Vitamin A in the Intestine of Lamprey, Entosphenus japonicus Martens," by J. Yamada; "The Softening Deterioration of Fish Sausage. I--Some Chemical and Microscopical Aspects," by H. Uchiyama and T. Tanaka; "The Softening Deterioration of Fish Sausage. II--Microbiological Studies of the Softening Deterioration," by M. Yokoseki, H. Uchiyama, and T. Mamizuka; "The Softening Spoilage of Fish Sausage. III--An Anaerobic Starch Digestion by Bacillus circulans isolated from Softened Part of Fish Sausage and Other Bacillus species," by H. Uchiyama, M. Yokoseki, and K. Motohashi; "Studies on the Internal Spoilage of Fish-Jelly Products. III--Measurement of Oxidation-Reduction Potential in Fish-Jelly Products," by M. Yokoseki; and "Chemical Properties of Oils in Gamma-Radiated Fish Meat and Products. Part I," by T. Kaneda, H. Sakai, and S. Ishii.

LAKE TROUT:

Mortality of Trout Caused by Hooking with Artificial Lures in Michigan Waters 1956-57, by David S. Shetter and Leonard N. Allison, Miscellaneous Publication No. 12, 15 pp., illus., printed. Michigan Department of Conservation, Institute for Fisheries Research, Ann Arbor, Mich., August 1958.

MARINE SCIENCE:

"Field Notes from the 1959 Eastern Pacific Cruise of the Stella Polaris," by E. Yale Dawson and Palmer T. Beaudette, article, Pacific Naturalist, vol. 1, no. 13, November 10, 1959, illus., printed in English with Spanish summary. The Beaudette Foundation for Biological Research, Box 482, RFD 1, Solvang, Calif. With present day interest in physical sciences and space-age technology, the natural sciences have been relegated to a position of relative unimportance by the public. This article is one of the series published by the Beaudette Foundation, established in 1958 to encourage and engage in research in the neglected field of marine biological systematics, ecology, and geography. Contains extracts from the writers' logs of the voyage of the Stella Polaris from the Gulf of Panama to Jalisco, Mexico, in the spring of 1959. Significant observations are recorded of marine plants, coralline algae, and organic production resulting from coastal upwellings.

MARINE VEGETATION:

Guide to Marine Vegetation Encountered during Herring Spawn Surveys in Southern British Columbia, by Donald N. Outram, Circular No. 44, 18 pp., illus., printed. Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, December 1957.

MARYLAND:

Exploratory Survey of Tidewater Bottom, Somerset County, Maryland (A Preliminary Report), by J. H. Manning and H. T. Pfitzenmeyer, Resources Study Report No. 12, 6 pp., illus., printed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., February 1958.

NETS:

Monofilament Nylon Web for Salmon Gill Nets, 1959, by P. J. G. Carrothers, Circular No. 54, 4 pp., processed. Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, October 1959. Describes a new type of nylon monofilament netting, Perlon, used experimentally by the commercial salmon gill-net fleet out of Steveston, B. C., in the summer of 1959. This type of netting has the advantage over the multifilament nylon netting of being less visible in the water. Greater catches were reported with the Perlon than with multifilm nylon netting. However, disadvantages such as knot slippage must be overcome before the new type netting can be fully accepted for salmon gill nets.

"Uber Einige Erfahrungen bei der Anwendung von Randparallelen Maschen fur Leitwehre und Flugel" (Experience with the Use of Parallel Meshes along the Rim for Leading Nets and Wing), by K. Schmidt, article, Deutsche Fischerei Zeitung, vol. 5, no. 4, April 1958, pp. 105-107, illus., printed in German. Neumann Verlag, Radebeul, Dresden, E. Germany.

NEW YORK:

The Present Program of the Marine Fisheries Unit of the New York State Conservation Department and a Proposed New Program, by Alfred Perlmutter, 10 pp., processed. Marine Fisheries Unit, New York State Conservation Department, Freeport, New York, June 14, 1957.

OCEAN PERCH:

"Red Flesh in Redfish, Sebastes marinus," by W. Templeman and E. J. Sandeman, article, Journal

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of the Fisheries Research Board of Canada, vol. 15, no. 4, July 1958, pp. 695-700, printed. Journal of the Fisheries Research Board of Canada, University of Toronto Press, Ottawa, Canada.

Redfish Distribution in the North Atlantic, by W. Templeman, Bulletin No. 120, 173 pp., printed, C$1.75. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1959.

PARASITES:

A New Microsporidan Parasite from the Pink Shrimp (PENAEUS DUORARUM), by Edwin S. Iversen and Raymond B. Manning, 3 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 88, 1959, pp. 130-132.) Librarian, Colorado A & M College, Fort Collins, Colo.

PLANKTON:

The Chaetognatha of the Eastropic Expedition, with Notes as to Their Possible Value as Indicators of Hydrographic Conditions, by Paul N. Sund and James A. Renner, 44 pp., illus., printed in Spanish and English. (Reprinted from Inter-American Tropical Tuna Commission Bulletin, vol. 3, no. 9). Inter-American Tropical Tuna Commission, La Jolla, Calif., 1959.

SALMON:

On the Causes of Fluctuation in the Number of Pacific Salmon and the Tasks in the Rational Use of Stocks, by R. S. Semko, 44 pp., processed. (Translated from Papers of the Conference on Questions of Fisheries, 1951.) Department of State, Washington 25, D. C.

The Food of Pacific Salmon in the Northwestern Pacific Ocean, by L. D. Andrievskaya, Translation Series No. 182, 16 pp., illus., processed. (Translated from Materialy po Biologii Morshovo Perioda Zhizni Dalnevostochnykh Lososei, 1957, pp. 64-75.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada, 1958.

SARDINES:

"Metodos de Cozimento das Sardinhas I" (Methods of Cooking Sardines, Part I), by F. Lopez-Capont, article, Conservas de Peixe, vol. 13, no. 146, May 1958, pp. 20-22, printed in Portuguese. Conservas de Peixe, Reguerao dos Anjos 68, Lisbon, Portugal.

SEA LAMPREY:

Distribution of Sea Lamprey Ammocoetes in Michigan Tributaries of Lake Superior, 1955-1957, by Thomas M. Stauffer and Martin J. Hansen, Miscellaneous Publication No. 11, 25 pp., illus., printed. Michigan Department of Conservation, Institute for Fisheries Research, Ann Arbor, Mich., August 1958.

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The Economics of Seals in the Eastern Canadian Arctic, by I. A. McLaren, Circular No. 1, 94 pp., processed. Fisheries Research Board of Canada, Arctic Unit, Montreal, Canada, 1958.

SHAD:

Distant Recaptures of Shad (ALOSA SAPIDISSIMA) Tagged in Quebec, by Vadim D. Vladykov, Contribution No. 54, 18 pp., illus., printed in English with French summary, 50 Canadian cents. (Reprinted from Le Naturaliste Canadien, vol. LXXXIII, no. 10, October 1956.) Department of Fisheries, Rm. 127, E. Bldg., Quebec, Canada, 1957.

SHRIMP:

Prawn Investigations in Eastern Australia, by A. A. Racek, Research Bulletin No. 6, 57 pp., illus., printed. State Fisheries, Chief Secretary's Department, New South Wales, Sydney, Australia, 1959.

A Shrimp Survey by the "Investigator No. 1," April 1953, Circular No. 28, 5 pp., processed. Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B. C., Canada, May 1953.

SPAIN:

Industrias Derivadas de la Pesca, Año 1956 (Fishery Industries, 1956), Deposito Legal M. 7619--1958, 128 pp., printed in Spanish. Instituto Nacional de Estadistica, Madrid, Spain. Covers Spanish canning, curing, and byproducts industries. Gives data on plants, number of employees, products produced, raw material and species used, and other data for 1956.

Investigacion Pesquera, vol. XIV, August 1959, 135 pp., illus., printed in Spanish with English summaries. Instituto de Investigaciones Pesqueras, Universidad de Barcelona, Spain. Includes, among others, these articles: "Consideraciones Acerca del Crecimiento de la Caballa (Scomber scombrus L.) en el Mediterraneo Espanol--Parte I" (Observations in Regard to Growth of the Horse Mackerel in the Spanish Mediterranean), by Carlos Bas Peired; and "Aparicion en la Costa Sudatlantica Espanol de Atunes Marcados en Noreuga" (Appearance on the South Atlantic Coast of Spain of Tuna Tagged in Norway), by Julio Rodriguez-Roda.

TARIFF AND TRADE:

United States Import Duties Annotated for Statistical Reporting (For Use in Preparing Import Entries and Withdrawals), with Classification for Countries (Schedule C) and United States Customs Districts and Ports (Schedule D), January 1, 1960 Edition, 672 pp., processed, $4. Bureau of the Census, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A simplified guide for use by importers in reporting information to collectors of customs from which monthly reports on foreign trade are compiled. The guide is a reproduction of United States Import Duties (1958) in tariff paragraph arrangement but annotated to include the statistical detail and the new 8-digit statistical reporting numbers required to be reported on the entry forms starting January 1960. A convenient

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index of commodities is included for finding the appropriate tariff paragraph. The new guide is intended to facilitate supplying the statistical requirements on entry forms by presenting the requirements in terms of the Tariff Act rather than in terms of the very different Schedule A arrangement as in the past.

TRADE LISTS:
The Office of Economic Affairs, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade list. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at $2 a copy.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, Producers, Refiners, and Exporters--Chile, 9 pp. (October 1959). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in fish oils and whale oils.

TROPICAL FISH:
The Status and Distribution of the Fishes of the Family Microdesmidae in the Western Atlantic, by C. Richard Robins and Raymond B. Manning, Contribution No. 214, 4 pp., printed. (Reprinted from Journal of the Washington Academy of Sciences, vol. 48, no. 9, September 1958, pp. 301-304.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

TUNA:
Techniques Used in the Tagging of Yellowfin and Skipjack Tunas in the Eastern Tropical Pacific Ocean during 1955-1957, by Gordon C. Broadhead, 7 pp., illus., printed. (Reprinted from Proceedings of the Gulf and Caribbean Fisheries Institute, Eleventh Annual Session, November 1958, pp. 91-97.) Inter-American Tropical Tuna Commission, La Jolla, Calif.

TURKEY:
Balik ve Balikcilik (Fish and Fishery), vol. 7, no. 11, November 1959, 33 pp., illus., printed in Turkish with table of contents in English. Contains, among others, these articles: "Fishing in Greece and Turkey's Fish Export to this Country," by Cihat Renda; "Trawl Fishing (Part II)," by Ilham Artuz; "The Necessity of Quality Control in Fish Canning Industry," by A. Baki Ugur; and "Sponge Fishing on the Aegean Coasts," by Tosun Sezen.

TURTLES:
The Green Turtle (CHELONIA MYDAS MYDAS) in Florida, by Archie Carr and Robert M. Ingle, 6 pp., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 9, no. 3, September 1959, pp. 315-320.) The Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla. Records the first documented observations of nesting emergences of the Atlantic green turtle on the coast of North America. Eggs from one nest were hatched and the young are now in collections of the University of Florida. The possibility of using such Florida-oriented hatchlings in any future restocking project is discussed.

UNITED KINGDOM:
Sea Fisheries Statistical Tables, 1958, 36 pp., printed, 4s. (56 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1959. Consists principally of statistical tables showing the quantity, total value, and average value of fish and shellfish production in England and Wales by species, region, and method of capture for 1958. Breakdowns of catches by vessels 40 feet and over, demersal landings, and pelagic landings are included. Data on foreign trade are shown. Information on the number of fishermen, vessels, and vessels by stations, methods, and gross tonnage are also given.

VENEZUELA:
"La Pesca Fluvial en el Desarrollo de la Economia Rural" (Inland Fishery in the Development of the Rural Economy), by Felipe Martin Salazar, article, El Agricultor Venezolano, vol. 23, no. 210, July 1959, pp. 13-17, illus., printed in Spanish. Ministerio de Agricultura y Cria, Caracas, Venezuela. A comprehensive article covering fish culture, fishery conservation, and other aspects of the inland fisheries of Venezuela.

VESSELS:
"Motor Tuna Clipper Balbaya," article, Marine Engineer and Naval Architect, vol. 81, October 1958, pp. 367-368, illus., printed. White Hall Technical Press, Ltd., 4 Catherine Place, London S. W. 1, England.

"A Nuclear Whaler," by G. W. Brokaw and others, article, Nuclear Engineering, vol. 3, November 1958, pp. 47-52, illus., printed. Temple Press, Ltd., Bowling Green Lane, London E. C. 1, England.

VIRGIN ISLANDS:
The Commercial Fishery of St. John, Virgin Islands, by C. P. Idyll, no. 8903, 14 pp., processed. The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla., November 1959. Covers a short survey of the commercial fishery of St. John as a part of the study of marine resources of that area. The principal objectives of the survey were to discover how much commercial fishing was being done, whether there appeared to be any signs of depletion of the fish stocks, and whether the commercial fishery was likely to affect sport fishing. Recommendations are that the commercial fishery should be encouraged to expand, that statistics of catch and fishing effort should be kept, and that marketing facilities should be created.

WALRUS:
The Walrus in the Canadian Arctic, by A. W. Mansfield, Circular No. 2, 13 pp., processed. Fisheries Research Board of Canada, Arctic Unit, Montreal, Canada, 1959.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

WASHINGTON:

Washington State Department of Fisheries, 68th Annual Report, 1958, 303 pp., illus., printed. Washington State Department of Fisheries, 4015 20th Ave., W., Seattle 99, Wash. This report includes information on the activities of the Department of Fisheries during 1958 in the fields of fish farming, marine farming and stream improvement, and enforcement. Sections are also included on otter trawling, offshore trolling investigations, the herring fishery, coastal investigations, Columbia River fisheries, contributions of the Columbia River, sports fishery, and salmon escapement during 1958. Specialized problems are dealt with in chapters on the menace of dogfish shark, commercial clamming, coastal pink shrimp fishery, program for oyster culture, oyster reserve management, oyster reproduction, and oyster rehabilitation research. Reprinted in its entirety is an article, "Salmon of the Pacific," by R. D. Hume, published originally in 1893. A considerable portion of the report is devoted to the 1958 fisheries statistical report containing data on commercial landings and fishway counts.

WHALING:

"Newfoundland Whaling," by Bruce Woodland, article, Trade News, no. 12, no. 4, October 1959, pp. 3-5, illus., processed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. Gives a short account of whaling in Newfoundland, past and present. The loss by fire of a processing plant at Hawkes Harbour leaves only one plant on the Island, at Dildo, Trinity Bay, which confines its operations to processing the meat of pothead and Minke whales and small quantities of oil. The history of whaling in Newfoundland began in the early seventeenth century with the colonization by Sir Richard Whitbourne. The industry represented a major segment of the economy of Newfoundland during most of the nineteenth century but began to decline with the development of petroleum resources. At present, whaling is regulated by the International Whaling Convention of 1946, to which Canada is signatory. The licensing of whaling factories which operate only as shore-based installations, is the responsibility of the individual provinces.

YELLOW PERCH:

The Yellow Perch, Its Life History, Ecology, and Management, by Elmer Herman and others, Publication 228, 12 pp., illus., printed. Wisconsin Conservation Department, Madison 1, Wis., 1959.

YELLOW PIKE:

The Walleye, Its Life History, Ecology, and Management, by Wallace Niemuth, Warren Churchill, and Thomas Wirth, Publication No. 227, 12 pp., illus., printed. Wisconsin Conservation Department, Madison 1, Wis., 1959.

YEARBOOKS AND DIRECTORIES:

Food, The Yearbook of Agriculture, 1959, 750 pp., illus., printed, $2.25. U. S. Department of Agriculture, Washington 25, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A comprehensive report on the production, processing, distribution, marketing, and preparation of foods, together with principles of nutrition and Government regulation of the food industry. Each chapter is written by an expert or experts in that particular food field, and the chapters are grouped under section headings of food backgrounds, nutrients, health, needs, quality, preparation, costs, trends, learning, and programs. Included in the chapter on food quality is a section on "Fish and the Fishing Industry," by Andrew W. Anderson, Assistant Director of the U. S. Bureau of Commercial Fisheries. The author discusses the nutritive value of fishery products, the program for establishing standards for fishery products, and the operation of a voluntary inspection system in the industry. He describes the activities of the Department of the Interior in behalf of the fishing industry and in the interest of the consuming public. Mention is made of the Fish and Wildlife Act of 1956 and the Saltonstall-Kennedy Act of 1954 and the accomplishments achieved by their implementation, towards both the prosperity of the fishing and allied industries and the welfare of the consumer. There are several illustrations showing world catch of fishery products, 1957; utilization of the U. S. commercial catch in 1958; estimated value of fishery products, 1957; a purchasing guide showing available forms of marketing fish; and other similar data.

YUGOSLAVIA:

Morsko Ribarstvo (Marine Fisheries), no. 9, Sept. 1959, 20 pp., illus., printed in Yugoslavian with the contents of main articles in English. Morsko Ribarstvo, V. Gagata 3, P. O. B. 185, Rijeka, Yugoslavia. Contains, among others, the following articles: "Influence of the Intensity of Fishing upon the Composition of Fish Colonies," by Sime Zupanovic; and "Influence of the Forest upon the Production in Coastal Waters," by Miljenko Buljan.

Morsko Ribarstvo (Marine Fisheries), no. 10, October 1959, 20 pp., illus., printed in Yugoslavian with the contents of main articles in English. Morsko Ribarstvo, V. Gagata 3, P. O. B. 185, Rijeka, Yugoslavia. Contains, among others, the following articles: "The Behaviour of Phytoplankton during Fertilization Experiments," by Tereza Pucher-Petkovic; and "Experimental Tank for Live Bait," by Radosna Muzinic. Also contains a report on the catching of Clupea sprattus by using submarine lighting, nets, and aspirators in the Caspian Sea; and a report, by Kresimir Sepic, from the X--International Congress of Refrigeration held in Copenhagen, August 19-26, 1959.

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ANTIGENS MAY IDENTIFY SALMON RACES

The Bureau of Commercial Fisheries Biological Laboratory, Seattle, Wash., tested blood samples from 110 Bristol Bay red salmon and 65 red salmon taken by the research vessel Pioneer on the high seas in the North Pacific in 1958. Results of the tests show certain antigens to be present in 98 percent of the American fish. In previous tests these same antigens were found to be absent from 98 percent of the Asian fish. The incidence of these antigens in the 1958 Bristol Bay reds confirmed past findings. Fifty-two of the 65 blood samples taken from salmon collected on or west of the present abstention line in the Pacific Ocean by the Pioneer in 1958 were determined to be characteristic of salmon of American origin.

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CANNING INDUSTRY CELEBRATES 150TH ANNIVERSARY

This is the year the Canning Industry celebrates its 150th birthday, and it seems only appropriate to light a special birthday candle for William Underwood the man who started canning in the United States.

During Napoleonic Wars, French armies traveled far from home base. The foreign lands they invaded often were stripped of forage by retreating enemies to such an extent that the problem of feeding the troops was acute. Armies suffered more casualties from bad food and starvation than from enemy muskets.

The French Government offered a prize of 12,000 francs to the person who could develop a method of preserving food effectively. Nicholas Appert, a Parisian confectioner, pickler, and vintner took up the exciting challenge. He worked at it for 14 years, and finally in 1809 he was successful. He found a method of preserving food so that it would keep, and in 1809 Napoleon presented him the award of 12,000 francs.

Appert packed his food like vintage wines, in bottles. He partially cooked the food, then placed it in bottles which were corked, wired, and submerged in boiling water. Without knowing it, he had sterilized food, stopping bacterial spoilage. The process worked, but the fragile glass containers often broke in transit.

A year later, in 1810, an Englishman named Peter Durand added a contribution to the infant preserving business. Durand took a clue from medieval workmen who in the 13th century had discovered that by dipping a sheet of iron into molten tin, they could stop corrosion and rust. Durand developed the "canister," an iron container plated with tin, with a soldered cover. He packed his "tin canister" with meat and soon one Britisher, then another, and another were eating his canned or "embalmed" meat as they jokingly called it.

In a pickling establishment in London at that time worked an ambitious young man named William Underwood, who was much intrigued by this new development of canning food. His ambition and adventurous spirit caused him to leave England and sail to America in 1817, eventually settling in Boston.

Here, where vessels were sailing every day for distant ports, and taking with them large stores of provisions and food, 30-year-old William Underwood started a canning plant at the edge of Boston Harbor, on what is now called Russia Wharf. The year was 1821, and the company which Underwood started is still owned by the Underwood family, and is America's oldest canning company.

William Underwood began his business by putting berries and fruit in glass jars. People were suspicious, however, of these new "preserved foods." They couldn't believe that food in jars could stay fresh and sweet for any length of time. But William Underwood found good customers for preserved foods among the seagoing men who needed provisions for long voyages around the Horn and to distant ports.

It was in 1939 that Underwood first used canisters to hold his variety of preserved foods. In the old ledgers of the Underwood Company, the number of canisters sold each day appears on page after page, but at one point a clerk who tired of continually writing that long word "canister" abbreviated it to "can," and that is how the word "can" came into being.

In those early days, the enterprising Underwood Company packed oysters and lobsters and salmon, some of which were sent to the West Coast where a great gold rush was going on. In fact, the first gold to reach the East Coast from California arrived in an emptied Underwood salmon can. Today the same company packs 16 specialized products, including sardines in tomato sauce, sardines in mustard sauce, sardines in salad oil, clam chowder, clam juice, and whole soft-shell clams.